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Bulletin 117

THE DISTRIBUTION OF BIRD LIFE IN THE URUBAMBA VALLEY OF PERU

A REPORT ON THE BIRDS COLLECTED BY THE
YALE UNIVERSITY–NATIONAL GEOGRAPHIC
SOCIETY'S EXPEDITIONS

BY

FRANK M. CHAPMAN
Of the American Museum of Natural History

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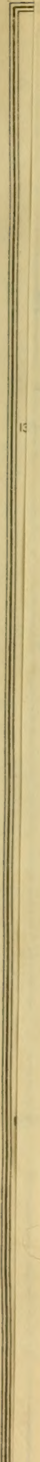
1921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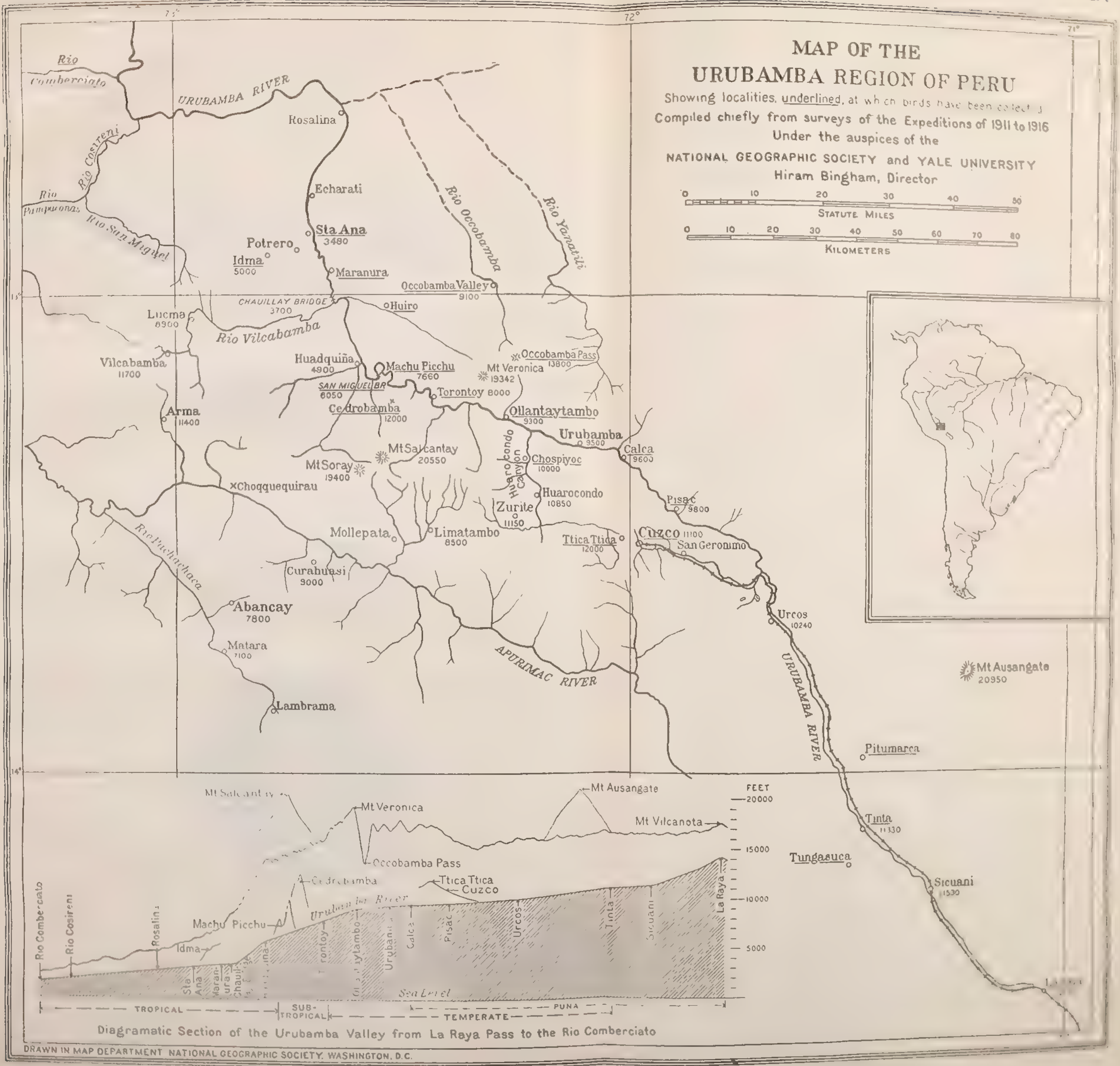

MAP OF THE URUBAMBA REGION OF PERU

Showing localities, underlined, at which birds have been collected
Compiled chiefly from surveys of the Expeditions of 1911 to 1916
Under the auspices of the
NATIONAL GEOGRAPHIC SOCIETY and YALE UNIVERSITY
Hiram Bingham, Director

Diagramatic Section of the Urubamba Valley from La Raya Pass to the Rio Comberciato

DRAWN IN MAP DEPARTMENT NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON, D.C.

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The scientific publications of the United States National Museum consists of two series, the *Proceedings* and the *Bulletins*.

The *Proceedings*, the first volume of which was issued in 1878, are intended primarily as a medium for the publication of original, and usually brief, papers based on the collections of the National Museum, presenting newly acquired facts in zoology, geology, and anthropology, including descriptions of new forms of animals and revisions of limited groups. One or two volumes are issued annually and distributed to libraries and scientific organizations. A limited number of copies of each paper, in pamphlet form, is distributed to specialists and others interested in the different subjects as soon as printed. The date of publication is recorded in the tables of contents of the volume.

The *Bulletins*, the first of which was issued in 1875, consist of a series of separate publications comprising chiefly monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, and catalogues of type-specimens, special collections, etc. The majority of the volumes are octavos, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable.

Since 1902 a series of octavo volumes containing papers relating to the botanical collections of the Museum, and known as the *Contributions from the National Herbarium*, has been published as bulletins.

The present work forms No. 117 of the *Bulletin series.*

William deC. Ravenel,
Administrative Assistant to the Secretary,
In charge of the United States National Museum.

Washington, D. C., March 19, 1921.

TABLE OF CONTENTS.

	Page.
Introduction	7
Previous ornithological work in the Urubamba Valley	9
Whitely's collections	9
Kalinowski's collections	10
Collections of Yale University-National Geographic Society's expeditions	11
Descriptions of collecting stations	12
Life zones of the Urubamba Valley	26
Tropical Zone	27
Subtropical Zone	30
Temperate Zone	30
Puna or Paramo Zone	35
North American migrants	40
List of species and subspecies described	40
Distributional list of the 380 species and subspecies of birds known from the Urubamba Valley	41
Index	125

LIST OF ILLUSTRATIONS.

PLATE 1.

Facing page

Map of the Urubamba region of Peru.. 1

PLATE 2.

Upper: Headwaters of the Urubamba River at La Raya Pass.
Lower: Occobamba Pass.. 14

PLATE 3.

Upper: Camp at Ttica-Ttica.
Lower: Huaracondo River and (in the distance) town........................ 16

PLATE 4.

Upper: Huaracondo Canyon at its entrance to the Urubamba Canyon.
Lower: Looking down the Urubamba River, toward Mount Salcantay, at Ollantaytambo.. 17

PLATE 5.

Upper: Camp at Astillero below Torontoy.
Lower: Urubamba River above Santa Ana...................................... 19

PLATE 6.

Forest in bottom of the Urubamba Canyon above San Miguel Bridge.......... 20

PLATE 7.

Forests of the Subtropical Zone in the Urubamba Canyon at Machu Picchu... 21

PLATE 8.

Upper: Timberline near Cedrobamba.
Lower: Forests near Cedrobamba.. 22

PLATE 9.

Upper: Chauillay Bridge over the Urubamba River.
Lower: Santa Ana Valley, Lower Urubamba Valley........................... 23

THE DISTRIBUTION OF BIRD LIFE IN THE URUBAMBA VALLEY OF PERU.

A REPORT ON THE BIRDS COLLECTED BY THE YALE UNIVERSITY-NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITIONS.

By Frank M. Chapman
Of the American Museum of Natural History.

INTRODUCTION.

The work of the Yale University-National Geographic Society's Expeditions in the Urubamba region of Peru, under the direction of Prof. Hiram Bingham, has included not only the archaeological investigations which have made the country explored so widely known, but also researches in other branches of science, the whole being designed to form a comprehensive survey of the physical conditions and biological resources of the area under consideration.

The task of making collections in vertebrate zoology was entrusted to the well-known naturalist, Edmund Heller, formerly of the Biological Survey, and the representative of the United States National Museum on the Roosevelt Expedition to British East Africa. The fact should be emphasized that Mr. Heller's first object in the field was the collection of mammals, and every one familiar with the difficulties of mammal collecting in the Andes will appreciate the skill and energy he displayed in amassing a collection of no less than 884 specimens.[1]

In collecting birds Mr. Heller attempted to secure species rather than specimens and his collection, therefore, contains a much larger number of forms than its size would lead one to expect.

Mr. Heller was in the field from April to November, 1915, during which time he made collections from the upper limit of life above the La Raya Pass (altitude 14,200 feet) to the dense forests of the humid Tropical Zone in the Rio Comberciato (altitude 1,800 feet). Between these extremes he worked at intermediate points representing every life zone in both its humid and arid aspects. Heller's work in the forests of the humid Temperate Zone at timber line (approximate altitude 12,500 feet) is of special importance. This zone has been previously explored in Peru only in the district about Maraynioc in the Eastern Cordillera somewhat north of the latitude of Lima, where von Tschudi, Jelski, and Kalinowski secured a surprising number of distinct new forms. The rainfall which produces the forest characterizing the humid Temperate Zone is also, in a measure, responsible for our ignorance of its life. The rain creates not only forests, but also rivers, and the river valleys form the natural sites for the trails which connect the highlands and lowlands. When the collector, in following these trails, reaches the region of Temperate Zone forests, his path is far below them and he thus passes under a zone of exceptional interest. I had this experience in the Eastern Andes of Colombia between Bogotá and Villavicencio;[2] while Kalinowski, who collected during several years in the Urubamba region, appears not to have worked in the forests of the humid Temperate Zone, though he lived within a few miles of them.

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[1] A report on this collection by Oldfield Thomas has been published in the Proc. U. S. Nat. Mus., vol. 58, pp. 217-249.

The authorities of the Yale University-National Geographic Society having honored me by a request to report upon Heller's collection of birds, I decided to alter an itinerary already made for a reconnaissance in South America, on which I was to start four days after this request was received, to permit me to make a hurried journey down the Urubamba Valley as far as Santa Ana. This was done under the auspices of the institutions just named.

Leaving Cuzco with our pack animals on July 1, we returned to that city on July 24, making meanwhile 13 camps in localities representing all the faunal areas of the region, except the humid Temperate and humid Tropical Zones, which the very limited time at my command prevented me from visiting. Unfortunately it had not been possible to make a critical examination of Heller's collections before leaving, or to examine his field notes, nevertheless I realize that without this personal experience, brief as it was, I should not be in a position to prepare even the provisional discussion of the faunal problems of this region which is presented beyond.

I was accompanied on this short expedition by that veteran collector, George K. Cherrie, and by my son, Frank M. Chapman, Jr., and at Tirapata we were joined by Harry Watkins, a resident naturalist who for some years before had been securing birds for the American Museum. Cherrie was the same invaluable lieutenant that he has been on former occasions, and Watkins proved an efficient aid. With the balance left from the appropriation made for this expedition by the National Geographic Society, Watkins was later employed to make collections at La Raya and in the Cuzco district in April, 1917.

Cordial acknowledgement for assistance in the preparation of the paper is due my staff associates, Mrs. A. K. Fraser, Mr. Ludlow

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[2] See Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 55.

Griscom, Mr. W. DeW. Miller, Mrs. E. M. B. Reichenberger, and Mr. Charles H. Rogers. To Mrs. Reichenberger I am especially indebted for a preliminary examination of specimens which greatly facilitated their final determination. I have also to thank Mr. Outram Bangs for the loan of specimens from the collections under his charge, and Mr. L. S. Blaisdell, of Arequipa, and Señor Carlos Duque, of Santa Ana, for courtesies and hospitalities extended to us in the field.

PREVIOUS ORNITHOLOGICAL WORK IN THE URUBAMBA VALLEY.

So far as published records go, our knowledge of the bird life of the Urubamba region is based upon the collections made by Whitely and Kalinowski and reported upon respectively by Sclater and Salvin and von Berlepsch and Stolzmann, references to whose works are included beyond.

Castelnau descended the Urubamba from near Cuzco to the Ucayali in the autumn of 1846, but beyond a reference [3] to the cock-of-the-rock, under the "Vallée de Santa Ana," I find no mention of the bird life of the district here under consideration in his works.

WHITELY'S COLLECTIONS.[4]

The first bird collector to enter the Urubamba region was Mr. H. Whitely, who, during the course of explorations in southern Peru, extending over a number of years, visited Tinta and vicinity in the upper valley in August, 1868, and the Santa Ana Valley subsequently.

From the first-named region he secured a fairly representative collection, but the collection from the Santa Ana district is far from complete. A list of Whitely's localities in the Urubamba Valley follows:

Tinta (altitude, 11,329 feet).—A small town midway between La Raya and Cuzco. It is in the Puna Zone, but the occurrence of *Diglossa brunneiventris* and *Thraupis darwini laeta* indicates that it is not far above the upper limits of the arid Temperate Zone. Whitely collected at and near Tinta from May to August, 1868, securing 131 specimens of 46 species, among them the types of *Lessonia niger oreas*, *Agriornis insolens*, and *Poospizopsis caesar*.[5]

Pitumarca.—A village near and slightly higher than Tinta (altitude, 11,329 feet) in the upper Urubamba Valley, visited by Whitely in 1868. Type locality of *Columba albipennis*.

Tungasuca.—A village near and slightly higher than Tinta (altitude, 11,329 feet) in the upper Urubamba Valley, visited by Whitely in 1868.

Huiro (altitude, 4,800 feet).—A settlement about 8 miles east of the junction of the Vilcabamba with the Urubamba at Chauillay

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[3] Hist. du Voy., vol. 4, p. 288.

[4] See Sclater and Salvin, Proc. Zool. Soc., 1869, pp. 151-158; 1876, pp. 15-19.

[5] Idem.

Bridge. It is evidently in the arid Tropical Zone, most of the 25 species secured here by Whitely being also found at Santa Ana. Type locality of *Thamnophilus melanochrous*.[6]

Maramora (altitude 4,000 feet).—A hacienda in the lower Urubamba (Santa Ana) Valley between Chauillay Bridge and Santa Ana. The country is essentially like that about Santa Ana. Whitely secured 22 species here.

Potrero (altitude 4,500 feet).—A hacienda above Santa Ana on the way to Idma. The immediate surroundings resemble those found at Santa Ana. Whitely secured 10 species here.

KALINOWSKI'S COLLECTIONS.[7]

The well-known collector of Peruvian birds, Jean Kalinowski, made a small collection in the vicinity of Cuzco and a larger one in the Santa Ana region. They were reported upon by Berlepsch and Stolzmann who regret their inability to give details of Kalinowski's journey other than the dates at which he visited various localities, and who present no general remarks upon the faunal questions involved. I transcribe the dates published by the authors named.

Cuzco District.—Cuzco, May 13, 1894; January 17, 1898; Urquillos, January 30, 1896; Suriti, May 13, 1894; Luatanay, May 22, 1894; San Geronimo, March 8, 1896; Curahausi, May 10, 1894; Licamachay, May 1, 1894; Vilcabamba, June 27, 1894; June 24, 25, 1895. In all, 13 species are recorded from these localities, the result, apparently, of incidental collecting. *Tanagra darwini laeta* was described from Cuzco.

Santa Ana District.—Santa Ana, June 2–22, July 5–11, August 28, September 8–22, November 2–22, December 4–19, 1894; Echaratí, September 16, 1894; Pacaymayo, June 1, 1894; Idma, June 30, July 1–31, August 2–30, October 11–31, November 2–24, 1894; June 7, 1895; Paltaypampa, November, 1894; June, 1895; Pampa de Derrumbe, June 1, July and October, 1894; Potrero, October, 1894; Puna de Idma, November 24, 1894; Tambillo, September 5, 1895; Casinchihua, May 7, 1894.

Santa Ana itself and Idma were the two principal stations for the 133 species recorded from the district, 56 being taken at the first-named, 75 at the last-named locality. It should be noted that the entry in this paper of "Idma, Sta. Ana," does not mean Idma *and* Santa Ana, but Idma in the district of Santa Ana. The difference is important, since Idma is in the humid Subtropical Zone. This fact should be especially noted in connection with the list of new forms said to have been described from Santa Ana,[7] only three of the nine mentioned actually having come from that place. They are the following: *Nothura maculosa peruviana*, *Myiozetetes similis connivens*, and *Sporophila gutturalis inconspicua*.

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[6] Proc. Zool. Soc., 1876, pp. 15–19.

[7] See Berlepsch and Stolzmann, Ornis, vol. 13, 1906, pp. 63–66; 73–105.

The following were described from Idma: *Lophotriccus squamaecristatus hypochlorus*, *Buthraupis cucullata saturata*, and *Basileuterus signatus*. Of the remaining three birds in this list of nine said to have been described from Santa Ana, two are from Chirimoto in the Chachapoyas district of northern Peru, and one from La Merced in the Chanchamayo district east of Lima.

COLLECTIONS OF YALE UNIVERSITY-NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITIONS.

As mentioned above, the Heller Expedition was in the field from April to November, 1915; the Chapman Expedition from July 1 to July 24, 1916; Watkins collected alone from April 3 to 25, 1917, and in 1914 made a small collection for the American Museum near Cuzco. The results of this collecting form the material basis of the present paper and may be summarized as follows:

	Number of specimens.
Heller Expedition	757
Chapman Expedition	744
Watkins Expedition	237
Watkins's Cuzco collection	95
Total number of specimens	1,833

The total number of species recorded by Whitely and Kalinowski is 202. From essentially the same region in which these collectors worked we secured 291 species. Adding to this number the species taken by Heller in the humid Tropical Zone on the Rio Cosireni and Rio Comberciato, a zone the collectors above mentioned did not enter, and 43 species which they secured and we did not, and we have a total of 380 species known from the Urubamba Valley. Further exploration, particularly in the humid Tropical Zone, would greatly increase this number. As a result of three and half years' collecting in a section from the Puna Zone at Lake Junin to the humid Tropical Zone at the eastern base of the Andes, Kalinowski secured 483 species. Adding to these, 66 species taken in the same region by Jelski, but not by Kalinowski, we have a total of 549. This number doubtless fairly represents the avifauna of the region explored, but further work in the humid Tropical Zone would unquestionably increase it. Our work in this zone was only sufficient to show the faunal affinities of our two stations in it. I believe also that the forests of the humid Temperate Zone contain a considerable number of species not represented in our collections, and it is certain that additional species could be secured in the forests of the Subtropical Zone, their density and the physical difficulties of mountain collecting making it far from easy to take a census of their inhabitants.

The collections from the arid Temperate Zone and from the Paramo or Puna Zone are doubtless reasonably complete. In both zones the fauna is comparatively limited and the open nature of the country renders it difficult for birds to escape observation.

DESCRIPTIONS OF COLLECTING STATIONS.

The detailed descriptions of the collecting stations, prepared chiefly by Heller, which are given beyond may be prefaced by an outline which, avoiding repetition as much as possible, may give consecutively the more significant features of the country under consideration as they affect the distribution of bird-life.

As used here, the term Urubamba Valley, is designed to include the district through which the Urubamba River flows from its source at La Raya to its entrance on the forested Amazonian plains at the Pongo de Mainique. Our survey includes not only the shores of the river but the slopes arising from it and crests overlooking it, all (excepting "Occobamba Valley") in Urubamba drainage.

The causes underlying the topography and climatic conditions, both general and local, of this region are fully treated in Bowman's "The Andes of Southern Peru,"[8] a work which may stand as a model of objective observation and subjective consideration.

My experience in other parts of the Andes confirms the opinion expressed, I believe, by Professor Bingham, that the Urubamba region contains the most impressive scenery of the entire Andean system. Certainly no other section of this great mountain chain has been more adequately photographed, but, although I was familiar with the results achieved and had seen the best of them as enlargements or lantern-slide projections, they gave me but a faint conception of the magnitude, grandeur, and diversity of the scenery of the region. Any attempt on my part to describe its beauties would therefore be not only foreign to my theme but fruitless.

So gradual is the slope from the shores of Lake Titicaca over the old lake bed to the pass at La Raya, so flat the grass-covered valley floor, that no striking topographic features announce the approach of the divide between Titicacan and Amazonian drainage. Only the accelerated motion of the train as it starts down the steeper grades of the upper Urubamba Valley tells the unobservant traveller that he has passed the highest point (altitude 14,010 feet) in his journey from Titicaca to Cuzco.

The country immediately south of the Pass is dry, upland pasture; but within a few yards north of the Pass one enters an area of marshes, springs, small streams, and lagoons in which the Urubamba River has its origin. The change is abrupt and striking and is accompanied by a change in the character of the bird-life, evident even from the window of a moving train, geese (*Chloephaga*), ducks of several species, ibis (*Plegadis*), coots (*Fulica*), replacing the occasional flickers (*Colaptes puna*) seen on the Titicacan side. (Pl. 2)

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[8] American Geographical Society.

Not a tree, nor indeed any suggestion of bushy growth, is seen; the region is above the limit of cultivation and is typical Puna.

About 20 kilometers north of the Pass, and nearly 2,000 feet below it, barley and low hedges of cactus were first observed, and bushes bordered the streams, indicating that we had reached the very tips of the arms of the arid Temperate Zone which stretch upward into the Puna Zone.

We have had no collecting stations between La Raya and Cuzco, but the presence in Whiteley's collections from Tinta (altitude 11,329 feet), about 12 kilometers north of Sicuani, of *Diglossa brunneiventris*, *Tanagra darwini laeta*, and *Saltator albociliaris* supplies the ornithological evidence of the existence of the arid Temperate Zone at this point.

Near Huambutio the railway leaves the Urubamba to ascend the Rio Huatanay to Cuzco. We did not see the Urubamba again until we reached it at the mouth of the Huaracondo Canyon (altitude 9,800 feet) well within the limits of the arid Temperate Zone. However, Watkins's collections from Pisac (altitude 10,060 feet) and Calca (altitude 9,957 feet), both on the Urubamba, acquaint us with the character of the fauna of the intervening country.

Our route from Cuzco lay slightly north of west through Ttica-Ttica, Puquiura, the Pampa of Anta, and Huaracondo, whence we descended the canyon of that name. (Pl. 3.)

After leaving Ttica-Ttica (altitude 11,900 feet) we traversed a rather flat country with a general elevation of 11,200 feet and bounded by grass-covered rolling hills, broken here and there by barrancas.

The region has been under cultivation for centuries. An occasional tree was seen on the hilltops, but if a forest ever existed here, it has long since disappeared, and the train after train of wood-laden burros which one passes show that the ceaseless demand for fuel is now supplied from farther down the valley.

The hillsides have some stunted, bushy growth which attains the size of small trees along the borders of streams in the barrancas.

Faunally the region is still one of interpenetration of the Puna and arid Temperate Zones, the former occupying the open country, the latter confined largely to the growth in the barrancas, as is described more fully beyond.

Soon after leaving the tableland at Huaracondo we quickly descended 1,000 feet down the trail leading to the bottom of the Huaracondo Canyon where a rushing river offers a suitable home for dippers (*Cinclus*) and torrent ducks (*Merganetta*).

The decrease in altitude and the presence of water combine to produce considerable bushy and arborescent growth with a corresponding increase in the number of arid Temperate Zone species. Country of essentially this type (see Heller's descriptions under Chospiyoc and Ollantaytambo) prevailed down the Urubamba Valley until we reached a short distance below Torontoy (which see), where at the bottom of the canyon and on the steep slopes arising from it we saw the first traces of forest growth, and at the same time entered the upper border of the Subtropical Zone.

Paroquets (*Aratinga m. mitrata*), ant thrushes (*Thamnophilus melanochrous*), flycatchers (*Knipolegus*), vireos (*Vireosylva j. josephae*), warblers (*Myioborus m. melanocephalus* and *Basileuterus luteoviridis signatus*), and other characteristic subtropical species suddenly became common, and a single cock-of-the-rock was seen.

From this point the vegetation increased in luxuriance. In places the narrow floor of the canyon was grown with highly developed forest which, unbroken, covered the slopes that were not too steep to permit of tree growth. (Pl. 6.)

The region seemed well adapted to the wants of birds, nevertheless comparatively few were seen and it was only by the most diligent collecting that we secured a fair number of specimens. It should, however, be remembered that the season was midwinter (July) and but few birds were in song. Day broke in almost complete silence. An occasional cassique (*Ostinops atrovirens*) called, a wood wren (*Henicorhina*) sang at intervals, but the croak of toucans and the cooing of doves, which form so prominent a part of the morning chorus in the subtropics and humid tropics, were wholly wanting.

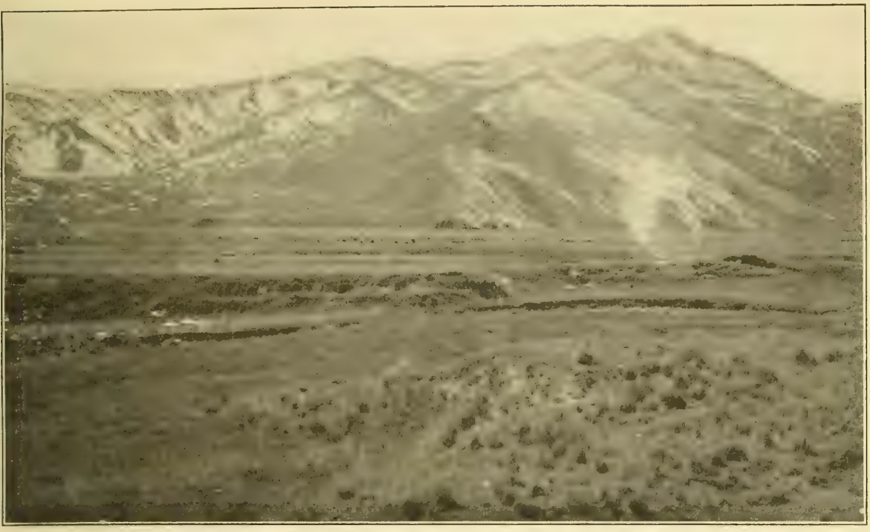
Shortly before reaching San Miguel Bridge, at the base of the mountain on which lie the ruins of Machu Picchu, made known to the world by Professor Bingham's explorations, the luxuriant forest growth disappears and we quickly pass into the upper border of the arid tropics with its low scrubby growth in which acacias and cacti characterize the vegetation and *Tapera naevia* and *Thraupis episcopus* the birds. (Pl. 5.)

Santa Ana, the end of our journey down the valley, is in the heart of this arid Tropical Zone, which extends at least to Echarati where the forest of the humid Tropical Zone is said to begin. This we did not reach and our only collections from it were made by Heller at Rio Cosireni and Rio Comberciato about 50 miles below Echaratí.

From Santa Ana we ascended the mountain slopes to the Subtropical Zone at Idma, finding there essentially the same species as occur in this zone above San Miguel Bridge.

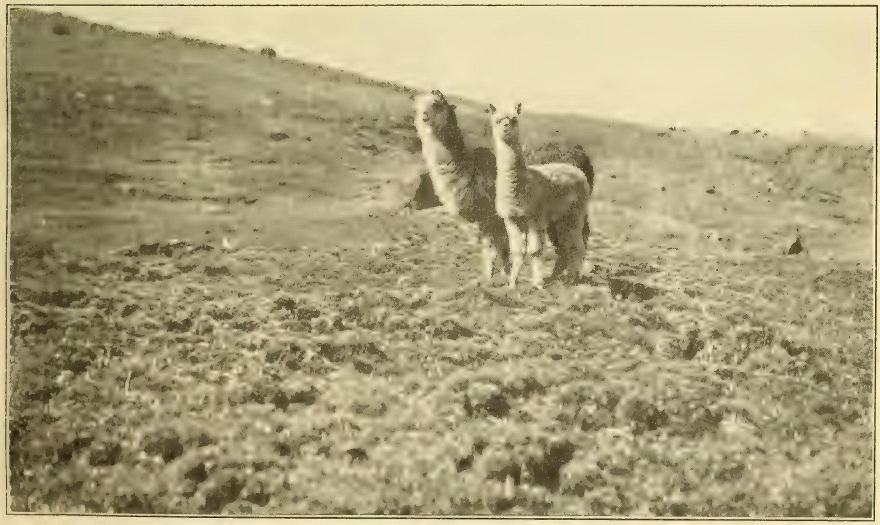
The more detailed description of our collecting stations follows:

La Raya (altitude 14,010 feet, Puna Zone).—The pass at La Raya on the railroad to Cuzco marks the divide between Titicacan and



HEADWATERS OF THE URUBAMBA RIVER AT LA RAYA PASS.

Altitude 14,150 feet. Puna Zone. Photographed by Chapman, June 30, 1916.



OCCOBAMBA PASS.

Altitude 13,800 feet. Puna Zone. Photographed by Heller.

Amazonian drainage. The ascent from the Titicaca Basin is very gradual; the descent toward Cuzco is more rapid, the last 30 kilometers of the ascent giving an increase of only 412 meters as compared with a fall of 647 meters for the first 30 kilometers beyond the divide.

The Urubamba River has its origin in the marshes and lagoons which lie immediately below the Pass. (Pl. 2.)

While at and near La Raya, November 9–25, 1915, Heller collected only mammals and our collection of birds from that place was made by Watkins. Beyond such widely distributed species as *Nycticorax naevius*, *Falco fusco-caerulescens*, *Brachyspiza capensis peruviana* and some others, the species secured are characteristic of the Puna. The following description of the region was written by Heller:

> La Raya Pass is an open, level-floored valley, grass-covered and dotted by small lagoons and marshy streams. Bounding the valley floor are rounded, grass-covered hills, and in places rocky ridges rising to a height of 2,000 or 3,000 feet. To the east of the Pass a view of snow-capped peaks, their sides furrowed by glaciers, may be obtained, but to the west the ridges are lower and without permanent snow fields.
>
> The temperature here was decidedly cool, or even bitter, during the day when the wind was blowing, and at night there was hoar frost. During our stay in November we were visited every evening about sunset by a violent thundershower of an hour's duration. The storm usually resolved itself into a hail or sleet affair accompanied by a heavy artillery of thunder and flashes of lightning which swept over the landscape until dark. The days were bright with sunshine and as a rule calm, but the temperature was always bracing, although the sun was powerful enough to melt the light coating of sleet of the previous night's storm.
>
> The region of La Raya is quite treeless and to all appearances bushless as well. Tussocks of coarse bunch grass with sharply spiked blades are the all-pervading floral feature. Other species of more tender grasses, on which the flocks of llamas and alpacas feed, grow with these, but they are much less conspicuous. Matlike clusters of small brilliantly green herbs grow in the damp meadows, but such are quite grass-like in general appearance. On the rocky hillsides amid the shingle and gravel are found clumps of a yucca or Spanish bayonet with whorls of gray spiny leaves and tall dried flower stalks of past seasons still standing. A cactus, a small white silky cereus, grows sparingly at this altitude. One of the few flowering plants seen here was a nettle-leaved herb bearing showy, poppy-red flowers. A few inconspicuous flowers of anemone-like appearance were seen in the meadows. High up on the hillsides a few verdant bushes were encountered, but they were very local in distribution.

Watkins' Expedition, April 3–13, 1917, 142 specimens of 40 species.

Pisac (altitude 10,060 feet, junction of arid Temperate and Puna Zones).—A town in the Urubamba Valley about 7 miles northeast of Cuzco.

Watkins' Expedition, April 17–20, 1916, 65 specimens of 23 species.

Calca (altitude 9,957 feet, junction of arid Temperate and Puna Zones).—A town in the Urubamba Valley near Urubamba with essentially the fauna of the Cuzco district.

Watkins' Expedition, April 21–25, 1917, 34 specimens of 25 species.

Ttica-Ttica (altitude 11,900 feet, junction of arid Temperate and Puna Zones).—The first camp of the Chapman Expedition was just off the Incan highway which leaves Cuzco through the Ttica-Ttica Pass, and about 3 miles west by north of that city. It is a region of hills, valleys, and barrancas devoted to grazing and the growing of barley. Although our visit was made in the heart of the dry season, there was still some water in the stream beds of the deeper barrancas. At the bottom and on the sides of these barrancas and in the smaller, tributary quebradas, there was more or less low, bushy growth. This growth here marked the upper limit of the arid Temperate Zone, while the grass-covered areas supported the avifauna of the Puna.

At 6 o'clock in the morning the mercury at this camp registered 30° F. (Pl. 3.)

Chapman Expedition, July 2 and 3, 1916, 55 specimens of 21 species.

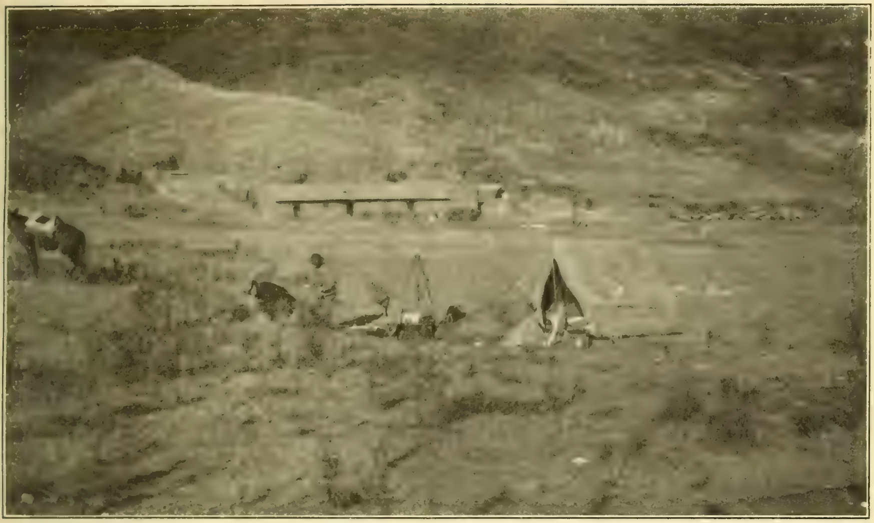
Huaracondo Canyon (junction of arid Temperate and Puna Zones).—A narrow, steep-walled canyon about 10 miles long, carved by the Huaracondo River from Huaracondo (altitude 11,200 feet) to the Urubamba River (altitude 9,800 feet). Its floor supports considerable bushy and arborescent vegetation, well described by Heller, who collected here at Chospiyoc (which see). Our camp was at "Pumatales," the hacienda of Señor Silva, at an altitude of about 10,000 feet, and apparently near the point at which Heller worked.

At 6 o'clock in the morning, July 23, the mercury registered 32° F.

Chapman Expedition, July 23, 1916; 55 specimens of 23 species.

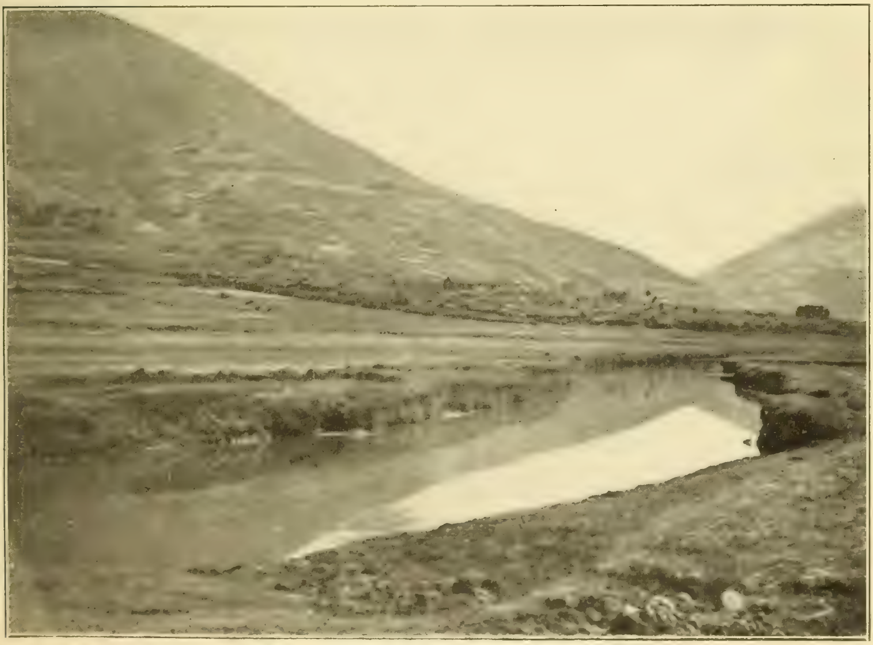
Chospiyoc (altitude 10,000 feet, junction of arid Temperate and Puna Zones).—Heller's station in the Huaracondo Canyon, evidently near the point at which the Chapman Expedition stopped for one day. The following description was written by Mr. Heller:

> The canyon of the Huaracondo River extends from the village of that name to the Urubamba Valley, where the river mingles its waters with the Rio Urubamba. Halfway down the canyon is situated Chospiyoc, a collection of cultivated fields, a hut, and a rickety bridge consisting of two crooked logs spanning the stream. The canyon is a perfect V-shape, with steep sides and a narrow floor occupied chiefly by the stream. Chospiyoc lies at 10,000 feet altitude, and the precipitous sides of the canyon rise above it some 3,000 feet to the general level of the Andean ranges here. The walls throughout all this half mile of vertical depth are alluvial deposits of gravel and clay, with no rock masses of large extent in place. The boulders lining the creek margin are many colors—white marbles, gray limestones, blackish slates, red porphyries, and many others.
>
> Our camp was pitched near the bridge, but across the stream from the cultivated fields of maize and wheat. During our stay here, in the latter part of April, the peach and apple trees were laden with ripe fruit, and the grain was also quite mature. The climate is quite dry at this point, most of the moisture falling at the higher altitudes on the summits of the ridges, where the clouds are held. Rain was falling abundantly at night in the region drained by the Huaracondo River, which was a terra-cotta red flood loaded with sediment from the adobe soil. The temperature at Chospiyoc is temperate, the days are pleasant and the nights cool, but not bitter. The natural tree flora is quite extensive in species, but trees are nowhere numerous.



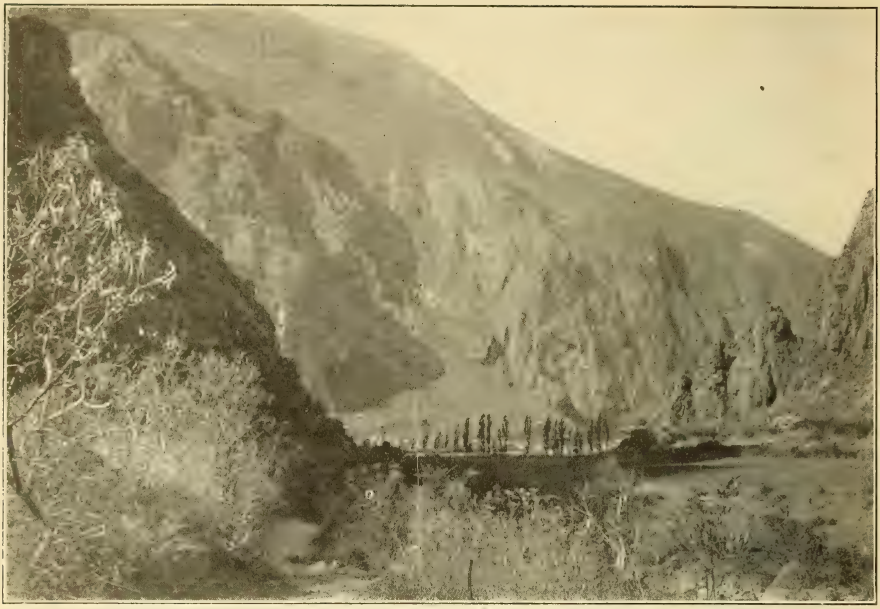
CAMP AT TTICA-TTICA.

Altitude 12,000 feet. Open country, Puna Zone; bush-grown "quebradas," arid Temperate Zone. Photographed by Chapman, July 3, 1916.



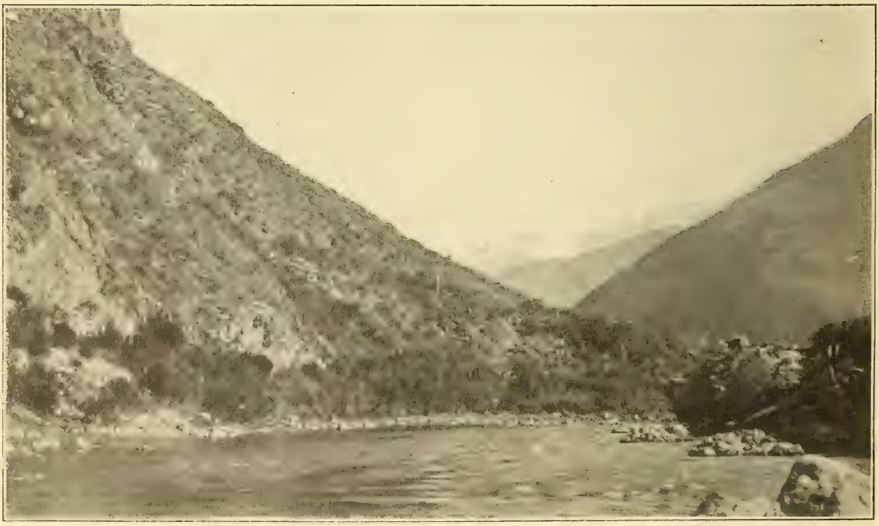
HUARACONDO RIVER AND (IN THE DISTANCE) TOWN.

Altitude 10,850 feet. Ducks, geese, ibis, gulls, and other Puna Zone species were common here. Photographed by Chapman, Jr., July 4, 1916.



HUARACONDO CANYON AT ITS ENTRANCE TO THE URUBAMBA CANYON.

Altitude 9,400 feet. Arid Temperate Zone. The trees in the distance are eucalyptus. Photographed by Watkins.



LOOKING DOWN THE URUBAMBA RIVER, TOWARD MOUNT SALCANTAY, AT OLLANTAYTAMBO.

Altitude 9,300 feet. Arid Temperate Zone. Photographed by Chapman, July 5, 1916.

Straggling willows and alders line the river margins, beneath which are smaller bushes of many sorts, but there are no groves or clump of trees. On the flat land and lower hill-slopes a few stunted pepper trees carry on a brave struggle for existence against the ax of the wood gatherers.

Much of the valley floor is covered by a growth of composite bushes of the genus *Baccharis*, which are the chief thicket-forming shrubs. On the drier slopes far above the creek the yucca or Spanish bayonet clings to the gravelly banks, and at rare intervals a giant cactus, a species of *Cereus*, stands conspicuous and grotesque amid the bushes and rocks. The smaller spiny tree cactus is also found here, as well as numerous other spiny bushes, such as the barberry, *Berberis flexuosa*, *Colletia spinosa*, and *Schinus dependens*. (Pl. 4.)

Heller Expedition, late April 14–23, 1915; 34 specimens of 19 species.

Ollantaytambo (altitude 9,300 feet, arid Temperate Zone).—This station lies in the arid Temperate Zone, the bushy and arborescent vegetation found here on the valley floor offering a home for such characteristic species of this zone as *Anaeretes flavirostris*, *Saltator albociliaris*, and *Diglossa brunneiventris*. Here, as we descended the valley, we found the last evidences of the Puna Zone in *Colaptes puna* and *Cinclodes fuscus rivularis*. (Pl. 4.)

Mr. Heller supplies the following notes on this station, at which the Chapman Expedition collected only on July 5:

One of the ancient Inca strongholds was the city of Ollantaytambo, situated some 10 leagues northwest of Cuzco in the Urubamba Valley at an altitude of 9,300 feet. At this point the valley has great depth, the river having cut its way through the eastern cordillera of the Andes. On either side tower great cliffs to a height of 4,000 feet or more, their summits splintered into many fantastic-shaped pinnacles. The rock formation is chiefly a yellowish flinty shale; in the immediate vicinity, but across the river, on the western side of the valley, are areas of reddish granite, black slates, and other rocks. The position of the town was secure against invasion, except along the valley approaches of the Urubamba and the tributary stream of Ollantaytambo Creek. In the neighborhood of the town the valley floors have been converted into great level terraces of a rich, black soil, free of rocks, which is devoted to the cultivation of maize and wheat chiefly. The climate is quite dry, and to provide against crop failures a series of canals for carrying water to the fields have been in use here since ancient times.

Ollantaytambo was our base station, and thither I returned at intervals during my eight months of field work. During April the rainy season draws to a close, rain falling in the night and then only in intermittent showers. May and June are bright, clear months, but July furnishes a few showers, which again give way to a dry season in August and September. Rain in considerable quantities falls in October, and the country under these deluges blossoms verdant as our own spring in the north. We may consider April to May the fall, July midwinter, owing to its greater cold, and October a spring month, to continue the comparison. There are, however, peculiar contradictions in the actions of some cultivated plants. Upon our arrival at Ollantaytambo in early April the peach and cherry trees were in blossom, as well as bearing nearly ripe fruit, apparently making a brave attempt to combine spring and fall. The native mountain-side shrubs, however, did not blossom as a unit until October, when the giant cactus, *Cereus*, and herbs generally put forth their floral efforts. Some of the native plants, such as the golden-flowered Spanish broom and *Stenolobium* bushes, blossomed in April and May. During the dry months the nights were cold, often bitter, the days bright and fresh, accompanied by a strong daily breeze up the valley, lasting from noon until sunset. The mountain slopes which wall in the city of Ollantaytambo have a decidedly arid appearance, the scattered vegetation of cactus and stunted bushes being far from adequate to cover the brown rocks and soil. Bordering the stream is a scattered growth of willows, alders, cherry trees, *Stenolobium*, a saxifrage tree (*Escallonia*), Spanish broom, *Baccharis* bushes, and others. Well above the valley the slopes and ridges support various grasses.

Heller Expedition, April 25; July 20–August 14; November 7–12, 1915; Chapman Expedition, July 5, 1916; 68 specimens of 27 species.

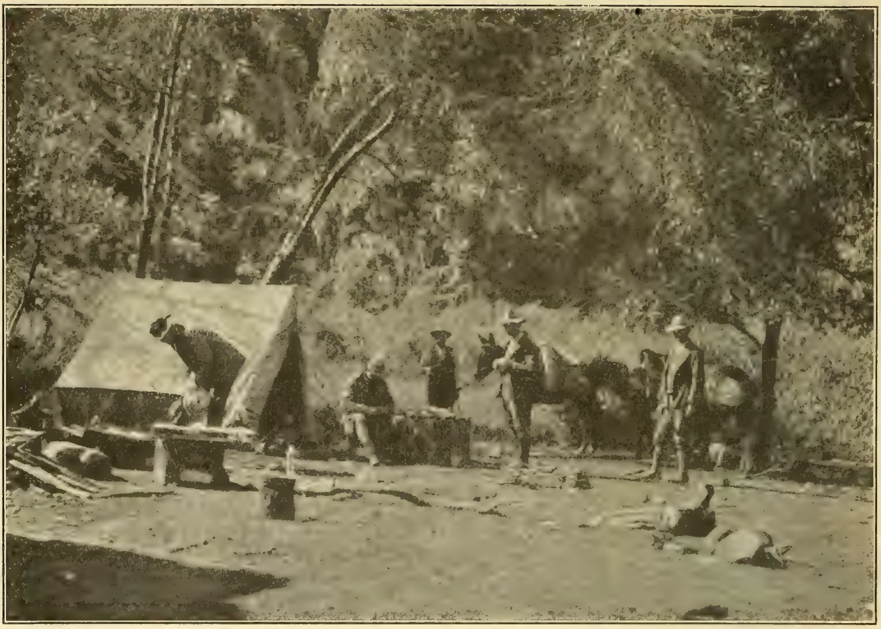
Occobamba Pass (altitude 13,800 feet; camp, 12,500 feet, Puna Zone).—The few specimens collected by Heller in this locality show, as might be expected, that it is in the Puna Zone. The species represented include our only specimens of *Thinocorus orbignyanus* and *Theristicus branickii* as well as examples of *Chloephaga melanoptera*, *Nettion oxypterum*, *Colaptes puna*, *Geossitta tenuirostris*, *Phrygilus unicolor*, etc.

Heller's description of this station follows:

> We have applied the name Occobamba Pass to the pass leading from the head of the Ollantaytambo Valley to the Occobamba Valley. The Occobamba Pass is traversed by a well-made road over which considerable traffic is carried annually. The pass lies some eight leagues north and above Ollantaytambo and has a summit altitude of 13,800 feet, by aneroid measurement. The rugged, mountainous character of most Andean passes is quite wanting here, and it is a great relief to find such a region as this, with gently sloping, rounded hills and wide shallow valleys. In the neighborhood of the pass the country has the appearance of a rolling prairie on a gigantic scale.
>
> The hills, when we visited the region in July, were covered by a thick growth of dried grass as far as the eye could see. No nude rock surfaces, no snow fields, no tree growths were visible; all was a rolling sea of brown grass. The climate is dry compared to the forested montaña country farther north, but the pass receives considerably more rainfall than Ollantaytambo owing to its greater elevation and proximity to the summit ridges. During our stay in July the weather was very cold, the coldest we experienced in Peru. The nights were bitter cold, freezing the margins of running streams as well as vessels of water actually inside the tent. The mornings, though sunny, were cold, until 9 a. m., and the climate was bracing even at midday. Shrubs and conspicuous herbs were quite lacking here. The bushy growth bordering the stream ceases at 12,500 feet altitude. Rock surfaces were seen in some of the higher tributary valley above the limits of vegetation, where a variety of formation of slates, shales, basalts, and granites were noted, but in the main valley disintegration had gone very far, all the hills being soil-covered, and supporting a growth of grass. In the neighborhood of villages, at altitudes of 11,000 to 13,000 feet, potato culture is extensively engaged in, the soil being rich black loam. Most of the valleys are, however, devoted to grazing herds of llamas, alpacas, sheep, horses, and mules.

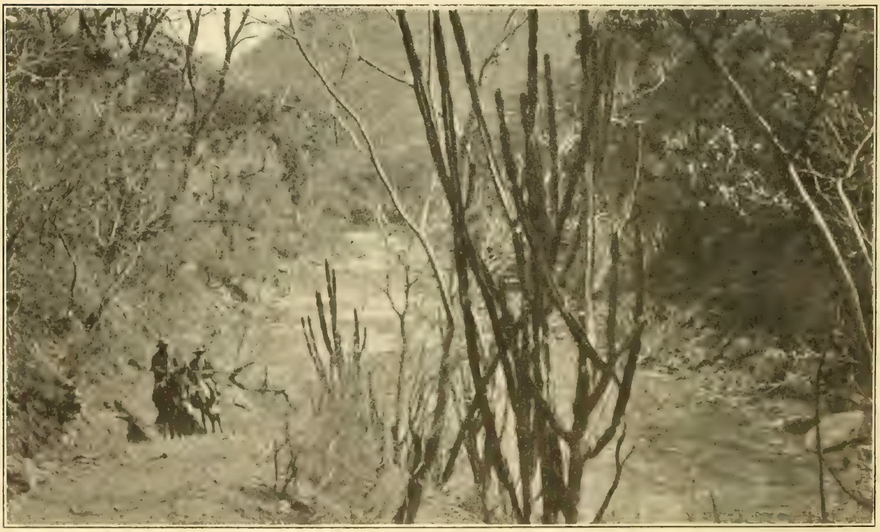
Heller Expedition, July 20, 21, 1915; 10 specimens of 12 species.

Occobamba Valley (altitude, 9,100 feet, humid Temperate Zone).—One of Heller's stations above Ollantaytambo. The presence here of *Grallaria rufula obscura*, *Heliochera cristata*, *Diglossa personata melanopis*, and *Conirostrum cinereum cinereum* indicates that it is in the humid Temperate Zone, apparently at its lower margin. Heller's description of this locality follows:



CAMP AT ASTILLERO BELOW TORONTOY.

Altitude 7,800 feet. Near the upper limit, on the canyon floor, of the Subtropical Zone. Photographed by Chapman, July 6, 1916.



URUBAMBA RIVER ABOVE SANTA ANA.

Altitude about 3,600 feet. Arid Tropical Zone. Photographed by Chapman, July 17, 1916.

Well down in the Occobamba Valley, at a point where the forested country meets the grassy uplands, we established our camp, at a spot called Tocopoqueyu. The camp was pitched in one of the terraced fields on the west bank of the creek, at an altitude of 9,100 feet. During our sojourn here in July the weather was bright and warm during the day and cool at night, but seldom bitter or windy. The country has a peculiar physical aspect, owing to one side of the valley, the eastern, being clothed by a dense forest, and the opposite, or western, being the very antithesis; that is, grass-covered and dry in character. The forest edge is definitely bound by the stream margin, which is lined by a growth of alder and willow trees. The alders here form a considerable part of the forest, and such as are found growing at a distance from the stream have widespread crowns and a grayish appearance seldom seen in riverside trees. Other forest trees are Eugenias, or cloves, Escallonias, and a large bay tree of the genus *Myrica*. Bamboo, as usual, forms a dense undergrowth in the forest.

The direction and constancy of the prevailing winds here seem to offer an explanation for the extraordinary difference in vegetation on opposite sides of the valley. The moist breezes coming up the valley from the hot lower montaña country are mist-laden and confined to the eastern side, along which the mist hangs, leaving the western side open, sunny, and dry. The fauna partakes of this divided character also, the forested side being the haunts of such marsupials as *Oriolestes*, *Peramys*, the pygmy opossum, *Didelphis*, and many species of forest rodents. On the west side we find white-tailed deer, coyotes, skunks, and rodents peculiar to the grassy Andean Zone. The country rock is granite, cliffs of which are exposed for several miles on the western side. (Pl. 2.)

Heller Expedition, July 23–Aug. 2, 1915.

Torontoy (altitude 8,000 feet, Subtropical Zone).—In descending the Urubamba Canyon the upper limit of the Subtropical Zone is encountered at Torontoy where the first evidences of forest are seen. Cactus, acacia, and other xerophytic forms are replaced by begonias and bananas and plantains, and such typical subtropical birds as *Thamnophilus melanochrous*, *Henicorhina l. leucophrys* and *Myioborus m. melanocephalus* soon became common. The Chapman Expedition camped at Astillero a short distance below the settlement of Torontoy where the growth is more luxuriant than at Torontoy. (Pl. 5.) Heller's observations are appended:

At the entrance to the canyon of the Urubamba stands Torontoy, once an important Inca stronghold. To-day we find a collection of Quichua huts set in the unlovely environment of pig wallows, and the abiding places of mules, goats, chickens, dogs, and other domestic creatures. Fields of maize cling to the steep sidehills on both sides of the valley, and above these extend the grass-covered slopes on which the herds graze. The altitude at Torontoy is approximately 8,000 feet, and the climate is mild and pleasant. Part of the year, December to May, is rainy, but much of the time there is fine, dry weather, without the fog conditions which prevail on the higher forested ranges guarding the valley. The rock formation is largely granite of a light grayish color. Cliffs of this material are seen bordering the river at various places, but the greater part of the country is grass-covered or else forested.

The Urubamba Valley at Torontoy is a deep V-shaped gorge some 3,000 or 4,000 feet deep, narrowing into a canyon immediately below this point. The scenery throughout the district is bold and carried out on a grand scale. Beyond the confining ridges of the valley occasional glimpses of snowy peaks, which mark the main cordilleras of the Andes, may be obtained.

> Growing at the river margin are alder and willow trees, forming a sort of border. The valley floor generally and the lower hillsides are bush-covered by the yellow-flowered *Stenolobium*, small *Escallonia* trees, pepper trees, giant cactus of the genus *Cereus*, tree-like *Opuntia* cactus, yuccas, and a host of peculiar floral forms.

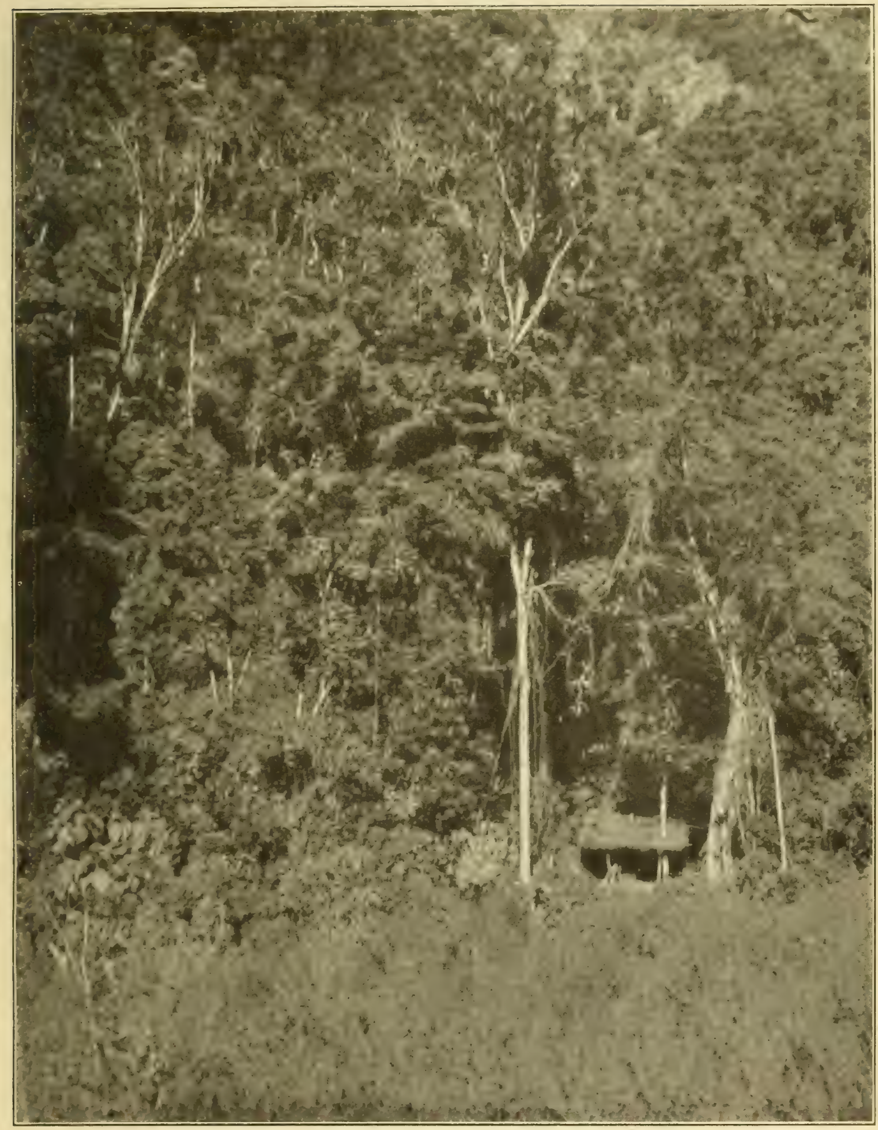
Heller Expedition, May, 1915; Chapman Expedition, July 10, 1916; 90 specimens of 33 species.

Above Torontoy (Altitude, 9,500–12,000 ft., humid Temperate Zone).—This region lies wholly within the humid Temperate Zone. It was visited by Heller largely in search of mammals, but the birds secured show its faunal affinities to be with those of Cedrobamba. Heller describes it as follows:

> The Urubamba Valley at Torontoy is unforested, but the mountain slopes of the eastern side fàr above the ancient villages are clothed by dense primeval forest to the limits of snow and glaciers. In this elevated forested region I established two camps, one at timber line on the steep mountain slope, at an altitude of 12,000 feet, and the other in the heart of the forest in a broad, level part of the creek valley, at 10,500 feet elevation. The mountain side at timber line was so steep that it was found necessary to dig out a platform large enough for the foundation of the 8 by 10 foot tent which I carried. The camp was pitched on a forested ridge, one side of which was bounded by a stream, and the other by a shallow ravine occupied by a grizzled glazier of small extent which terminated not far below. The nights were bitter cold, and when the sky was unclouded the ground at dawn was white with a heavy frost. The days as a rule were misty, but seldom rainy, the mist being of a dripping, saturating sort, quite as effective as rain. Early in the morning before the mists had rolled up as high as timber line, a magnificent view of the snow peak of Salcantay and the high ranges over which it dominates could be seen across the cloud-filled valley of the Urubamba.
>
> The forest vegetation of the timber-line area near camp was made up principally of three features; tall bamboo thickets, trees, and the shorter grassland of the Andean Zone. *Acaena* trees grew to immense size here, some of them being 8 feet in diameter. Much of the very highest forest was made up of small *Gynoxys* trees of uniform size and free from bamboo or undershrubs. The ground in these forests was carpeted by a heavy coat of elastic green moss into which we often sank ankle-deep, while the tree trunks and branches were festooned by loads of gray and black lichens. The rock formations in the immediate vicinity of camp were hidden by the vegetation, but the higher slopes above the limits of vegetation appeared to be dark gray slates in composition.
>
> The central camp was established in the middle of a wide part of the valley of Torontoy Creek at 10,500 feet altitude at a place where the original trail-builders into this unknown forest had erected a temporary hut a few months previously. The stream ran beside the camp over a pebbly bed, limpid, cold and almost tranquil. On all sides the forest spread completely filling the valley and ascending the steep slopes to the lower limits of snowfields at the summit. The trees in character differed somewhat from those at timber line, the number of species being considerably greater and the undergrowth of bushes and bamboo much more luxuriant. The ground moss and open character of the upper forest was quite wanting. The climate was milder. At night it was cool, but no frost occurred.

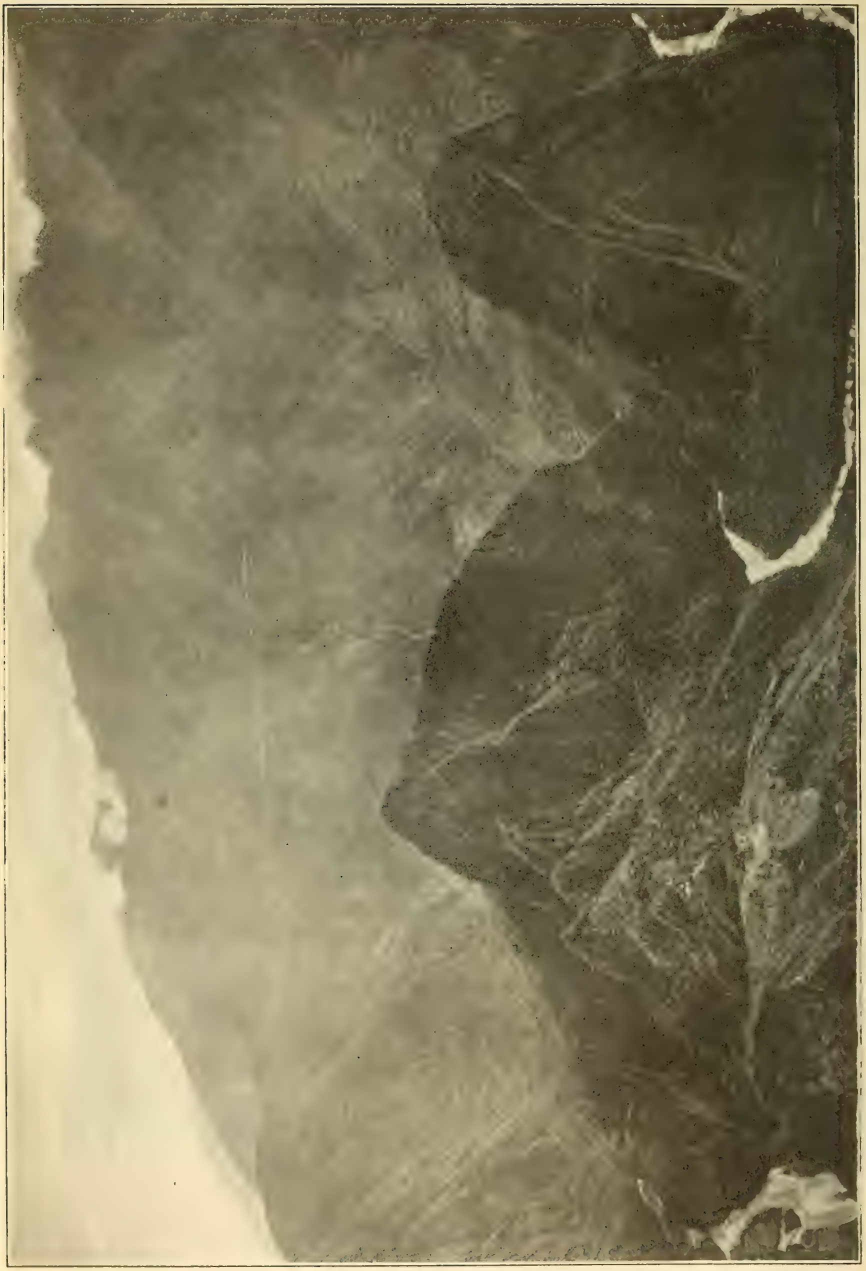
Heller Expedition, May, 1915; 47 specimens of 24 species.

San Miguel Bridge (altitude, 6,000 feet, Subtropical Zone).—An important collecting station for both the Heller and Chapman expeditions. The river bottom here lies at the lower border of the



FOREST IN BOTTOM OF THE URUBAMBA CANYON ABOVE SAN MIGUEL BRIDGE.

Altitude about 6,200 feet. Subtropical Zone. Photographed by Chapman, July 19, 1916.



Forests of the Subtropical Zone in the Urubamba Canyon at Machu Picchu.

The ruins of this city lie on the ridge in the foreground. San Miguel Bridge (altitude 6,000 feet), a base of both Heller and Chapman Expeditions, crosses the Urubamba River a short distance below the point shown in the lower left-hand corner. Photographed by Bingham.

Subtropical Zone, and a short distance below the bridge one passes into the arid Tropical Zone. Above the bridge and for the greater part of the way to Torontoy, the mountain slopes, and favorable places at the bottom of the canyon are covered with a highly developed, luxuriant cloud forest, the home of such characteristic species of the humid subtropics as *Pharomachrus auriceps* and *Rupicola p. peruviana.* (Pl. 6.)

Mr. Heller's description of this locality is appended:

> Immediately below Machu Picchu, on the floor of the valley, is the Bridge of San Miguel, over which passes all the traffic between Cuzco and the lower part of the valley. At this point the walls of the valley rise perpendicularly for 3,000 or 4,000 feet, and in some places, such as opposite the base of Machu Picchu, the walls are 5,000 feet high. The stream margin of the waters for a short distance above the bridge is bordered by wide, gravelly bars and forest-grown flats of river alluvium. The bridge stands at 6,000 feet altitude and enjoys a singularly mild and equable climate. The nights are delightfully cool and the days are semitropical. Much of the canyon at this point is shaded from the direct rays of the sun part of each day by towering cliffs which rise vertically from the floor. A great variety of tree growth occurs along the stream and the sides of the valley where talus slopes offer a foot-hold for vegetation. The largest of the trees is one of the Leguminosae of the genus *Erythrina* which bears a profusion of carmine flowers. This tree is found scattered through the forest bordering the river; its great swollen trunk and wide-spread crown giving it a peculiarly distinct appearance. Upon talus slopes and new ground generally grow clumps of the graceful trumpet-trees, *Cecropia*, the drooping, lobed, peltate leaves giving them a graceful distinction. Killer figs, with strangling limbs and roots fastened to the wall of cliffs or growing as epiphytes on the trunks of other trees, rear themselves in every available nook. A common riverside tree is the pacay, bearing spherical heads of flowers which are a favorite source of food for hummingbirds. Small ferns of many kinds abound in the shade of other trees. Both bamboo and palms are wanting in the immediate neighborhood of San Miguel Bridge. The common trees bordering the stream or growing on the alluvial flats were willows and alders. (Pl. 7.)

Heller Expedition, June 17–July 10, 1915; Chapman Expedition, July 7, 18, 19, 1916; 269 specimens of 74 species.

Cedrobamba (altitude 12,000 feet, junction of humid Temperate and Puna Zones).—Although Heller collected only 54 specimens at and near Cedrobamba they form, from a faunal standpoint, the most important part of the entire Urubamba collection. Of the 30 species represented, 18 were not found elsewhere, while 8 of the remaining 12 were found only in the Occobamba Valley or above Torontoy, localities which evidently lie in the zone (humid Temperate) which finds its upper limit at Cedrobamba. (Pl. 8.)

Heller's description of this locality is appended:

> The high and narrow ridge upon which the ancient city of Machu Picchu is situated rises in a series of undulations to the southward, the first wave being the peak of Machu Picchu, a second Ccorihuayrachina, and the third in a northerly direction the ridge on which stand the ruins of Cedrobamba. The camp at Cedrobamba, which had an altitude of 12,000 feet, was placed a hundred feet below the ruins at the head of one of the tributaries of the Rio Acobamba, a rushing mountain torrent which adds its waters to the Urubamba a mile below San Miguel Bridge. Cedrobamba is situated

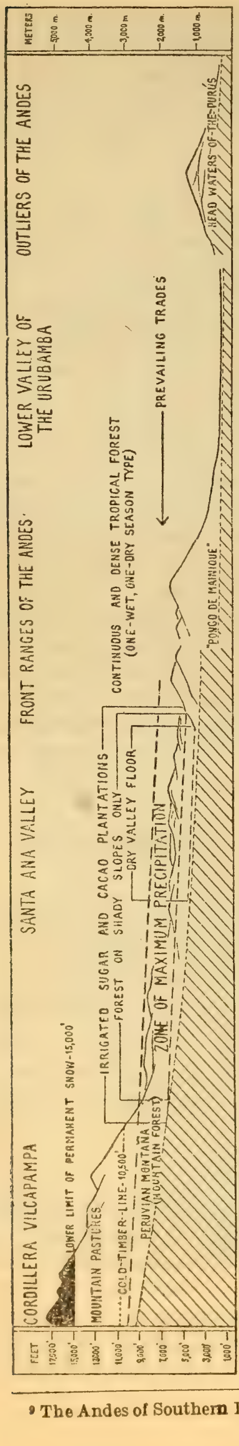
exactly on the parting of the great forest of the Amazonian Basin and the grassland of the Andean pampa region. The forest at this place stops as abruptly as if cut by a knife, quite as sharply as a hedge row on the borders of a lawn; long tongues of forests in places, however, follow up the creek margins or ascend favorite slopes to a thousand feet beyond the general forest limits. There is no dwarfing of trees or diminution in their numbers on the borders. A variety of trees grew at the timber-line edge. There were shaggy barked *Acaena ochreata* trees with drooping masses of gray-green foliage, small, erect *Gynoxys* trees with their dome-shaped crowns adorned by golden composite blossoms, a white-barked Melastomataceous tree of the genus *Miconia* towered above all with its spidery branches spreading in every direction. A small, stout-trunked fern, an arborescent *Lomaria*, was a constant feature of the forest edge. Bamboo grass (*Chusquea quila*) in some places intertwined its light green stalks with the trees, but it was chiefly along the borders of streams and on swampy soil that it flourished. Mosses and lichens of many colors and sorts smothered the tree trunks and branches, making them in appearance many times their actual size. The gray-beard lichen was the prevalent one on the terminal parts of the branches, and another, a deep black species, confined its affections to the trunks and larger branches. Beyond the forest a luxuriant growth of grass covered the mountain slopes, mingled with which, but in close proximity, were small huckleberry bushes, *Baccharis* bushes and a few tall herbs. Cedrobamba climatically was damp and cold. It was at the edge of a more or less permanent fog bank, the limits of which seemed to coincide with that of the forest.

Rain in great quatities apparently does not fall here, but the region is constantly bathed in cold mists. The nights are cold but seldom bitter, the daily extremes of temperature being considerably less than in the drier region farther inland of equal elevation.

Heller Expedition, May 23–June 15, 1915; 54 specimens of 30 species.

Santa Ana (altitude 3,480 feet, arid Tropical Zone).—The valley of Santa Ana is a semi-arid tropical pocket shut off from the heavy rainfall of the true Amazonian region by the range of the Andes which lies to the eastward of it. Bowman [9] presents a diagram (here reproduced) of the climate of the eastern slope of the Andes and writing of Santa Ana says:

> It will be seen that the front range of the mountains is high enough to shut off a great deal of rainfall. The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CORDILLERA VILCAPAMPA
SANTA ANA VALLEY
FRONT RANGES OF THE ANDES
LOWER VALLEY OF THE URUBAMBA
OUTLIERS OF THE ANDES
LOWER LIMIT OF PERMANENT SNOW-15,000'
MOUNTAIN PASTURES
COLD-TIMBER-LINE-10,500'
PERUVIAN MONTAÑA (MOUNTAIN FOREST)
IRRIGATED SUGAR AND CACAO PLANTATIONS
FOREST ON SHADY SLOPES ONLY
DRY VALLEY FLOOR
ZONE OF MAXIMUM PRECIPITATION
CONTINUOUS AND DENSE TROPICAL FOREST (ONE-WET, ONE-DRY SEASON TYPE)
PREVAILING TRADES
PONGO DE MAINIQUE
HEAD WATERS OF THE PURUS
FEET
17,000'
15,000'
13,000'
11,000'
9,000'
7,000'
5,000'
3,000'
1,000'

FIG. 1.—CLIMATIC CROSS-SECTION FROM THE CREST OF THE CORDILLERA VILCAPAMPA DOWN THE EASTERN MOUNTAIN VALLEYS TO THE TROPICAL PLAINS. (FROM BOWMAN'S "THE ANDES OF SOUTHERN PERU," BY COURTESY OF THE AMERICAN GEOGRAPHIC SOCIETY.)

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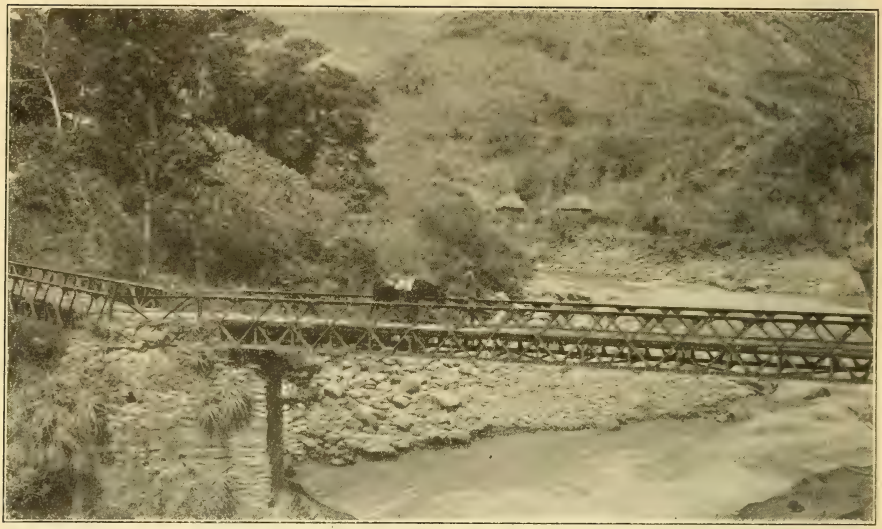
[9] The Andes of Southern Peru, p. 79.

TIMBERLINE NEAR CEDROBAMBA.

Altitude about 12,500 feet. Junction of humid Temperate and Puna Zones. Photographed by Bingham, May 11, 1915.

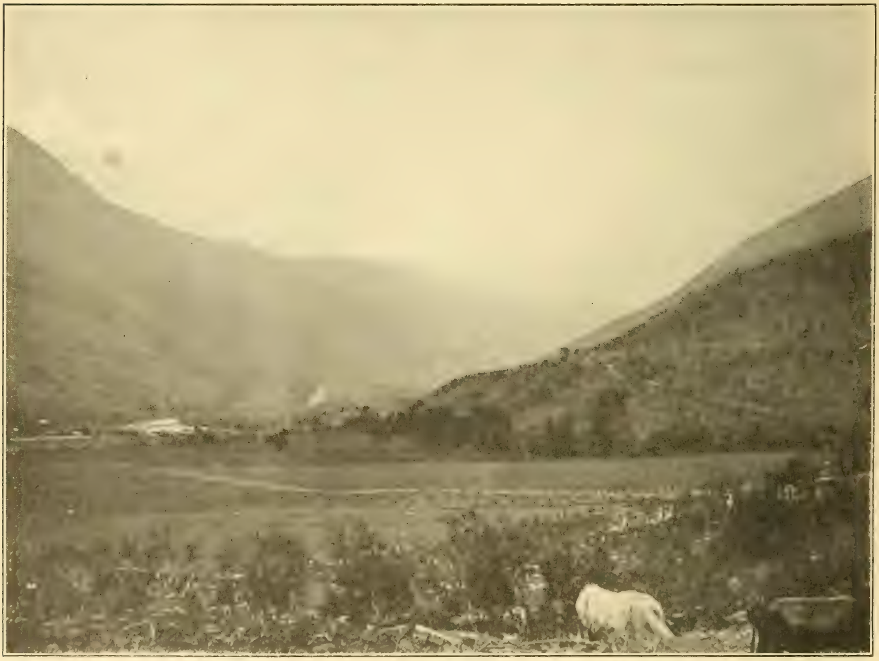
FORESTS NEAR CEDROBAMBA.

Altitude about 12,000 feet. Humid Temperate Zone. Photographed by Bingham, May 12, 1915.



CHAUILLAY BRIDGE OVER THE URUBAMBA RIVER.

Altitude 3,700 feet. Arid Tropical Zone. Photographed by Chapman, July 9, 1916.



SANTA ANA VALLEY, LOWER URUBAMBA VALLEY.

Altitude 3,500 feet. Arid Tropical Zone. Photographed by Chapman, Jr., July 16, 1916.

> lower hills and ridges just within the front range are relatively dry. The deep valleys are much drier. Each broad expansion of a deep valley is therefore a dry pocket. Into it the sun pours even when all the surrounding hills are wrapped in cloud. The greater number of hours of sunshine hastens the rate of evaporation and still further increases the dryness.
>
> The influence of the local climate upon tree-growth is striking. Every few days, even in the relatively dry winter season, clouds gather about the hills and there are local showers. The lower limit of the zone of clouds is sharply marked and both at Santa Ana and Echaratí it is strikingly constant in elevation—about five thousand feet above sea level. From the upper mountains the forest descends, with only small patches of glade and prairie. At the lower edge of the cloud zone it stops abruptly on the warmer and drier slopes that face the afternoon sun and continues on the moister slopes that face the forenoon sun or that slope away from the sun.

It may be added that this cloud forest, which so strongly characterizes the Subtropical Zone, descends in drainage areas considerably below the 5,000-foot level—a condition clearly illustrated by a photograph of the western slope of the Central Andes of Colombia published in my Distribution of Bird Life in Colombia.[10] The climate of the Cauca Valley, it may further be said, is due in a large measure to the causes which create semi-aridity at Santa Ana.

Santa Ana is historic in the annals of Urubamba ornithology. Formerly the site of a Jesuit Mission it is now a hacienda devoted to the production of sugar cane and coca where the unbounded hospitality of the proprietor, Señor Duque, the delightful climate, the ease with which adjoining areas may be reached have induced practically all the naturalists and explorers who have visited this region to make it, for a time, their headquarters.

Kalinowski collected here at intervals from June to December, 1894, securing, according to Berlepsch and Stolzmann[11], examples of 56 species. Various members of the Yale University-National Geographic Society Expedition also stopped at Santa Ana, including Heller, whose notes on the region are here appended:

> The valley at Santa Ana is particularly wide, fully a league, and the confining slopes are gentle, although they rise to considerable heights and give the valley a deep effect. Owing to the great width of the valley, and the distant position of the summit ridges, the rain clouds do not collect at this point but pass on and hang themselves to the higher slopes beyond. While we were at Santa Ana in October, the days were bright and clear, but not far distant could be seen the rain clouds and storms in progress and occasionally the thunder reached our ears. The valley floor is covered by a black humus soil, and devoted largely to coca culture, but cane fields are numerous, and, at certain seasons, maize also. The valley slopes show a red soil where they are not grass-covered. Bordering the river are groves of the graceful algaroba trees, the timber of which has been used in the construction of the hacienda buildings which were originally designed for the purpose of a mission station. *Cecropia* and *Erythrina* trees border the creeks and fields, but the landscape generally has a highly artificial and denuded aspect. The altitude is 3,480 feet, but owing to the dryness at this particular point, the climate is cooler than usual at so low an elevation, corresponding to that of San Miguel Bridge, which has an altitude almost twice as great. The manager of the

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[10] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, pl. 27.

[11] Ornis, 1906, pp. 73–102.

hacienda, Don Carlos Duque, informed me that as late as twenty years ago several species of large currasows, guans, parrots, tinamous, and other tropical birds, were to be found in the scrubby or bush country in the vicinity, but that constant shooting by villagers had exterminated them. (Pl. 9.)

Heller Expedition, October 25, 1915; Chapman Expedition, July 11–14, 1916; 116 specimens of 37 species.

Idma (altitude 5,000 feet, Subtropical Zone).—The hacienda of Idma, some 9 miles southwest of Santa Ana and 1,500 feet above it is in the humid subtropics. Traces of forest first appear at an elevation of 4,200 feet, but the floor of the valley has long been deforested and is largely devoted to the growing of sugar cane. The steeply ascending mountains are heavily wooded from the valley to their summits, and a short distance above the hacienda, where our camp was made, the country is everywhere forested. The fauna is typically subtropical and closely resembles that of the Urubamba Canyon above San Miguel Bridge. Kalinowski collected at Idma chiefly in July, August, October, and November, 1894, securing representatives of 75 species.[12]

Mr. Heller's notes on Idma follow:

> Idma is without doubt one of the rainiest places in all Peru. There is scarcely a day throughout the whole year in which some rain does not fall at this spot. Such conditions, however, are very local and due largely to the high forested ranges which overhang the hacienda of Idma. A league or two lower down the valley, toward Santa Ana, the sun holds sway half of the year at least part of each day. The unfortunate inhabitants of Idma have daily vistas of sunshine lower down the valley through the very raindrops that give this place its distinction. The altitude at the hacienda is 5,000 feet. The temperature is seldom disagreeably warm in the daytime and at night it is comfortably cool so the climate, barring its wetness, may be described as delightfully semitropical.
>
> Originally the slopes and floor of the valley were occupied by a heavy forest which was removed centuries ago by the Incas. Within a stone's throw of the cultivated fields above the hacienda the dark primeval forest sweeps down from the range above and beyond. Idma is a cultivated nook of valley projecting into the great forest and maintained only by constant strife with the forces of nature.

Heller Expedition, October 10–23, 1915; Chapman Expedition, July 11–14, 1916; 239 specimens of 72 species.

Rio San Miguel (altitude 4,400 feet, humid Tropical Zone).—One of Heller's collecting stations at the upper margin of the humid Tropical Zone. It is described by him as follows:

> Our introduction to the lowland forest of the Amazon basin took place at San Fernando, which is situated on the upper borders in the hill country at the foot of the Andean cordillera. The geographical position of this spot is some ten leagues northwest of the village of Lucma from which it is separated by a high, cold spur of the Andes in which the headwaters of the Rio Cosireni take their rise. San Fernando is situated well down in the drainage area of this river at 4,400 feet altitude in the valley of a tributary stream, the Rio San Miguel, a few miles above its junction with the Rio Pampaconas. The spot to which the name San Fernando is attached is marked by a single hut in the neighborhood of which sugar cane, cassava, coffee, ground nuts, pine-

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[12] Ornis, 1913, pp. 73–102.

apples, bananas, and a few other tropical fruits are grown by the Mestizo family which make this place their home. At this point the valley of the San Miguel is wide, level, and densely forested.

The climate has the delightful balmy qualities of that of San Miguel Bridge and Huadquiña, combined with a somewhat greater degree of heat and much more humidity. On bright days the weather is really hot but the sky as a rule is overcast part of each day. During our visit in October, rain fell almost every night for a few hours, usually in the form of a thunder shower.

The tree growth fills the whole valley from the floor to the summits of the confining ridges. The forest is of a mixed character, the number of tree species being large, but the different species are everywhere scattered so universally that there is really no marked uniformity in the general appearance of the woodland. I recognized in this forest several species of trumpet trees, figs, tree ferns, small palms, cedros, etc. Traveling, as a rule, was not difficult through the forest, except near streams where the trees were bound together by giant vines and creepers.

The chief avenue of exploration in this region, however, was the road cut by the rubber gatherers for the transport of the rubber from Yuvini to Lucma, and then to Cuzco. This road was cut some 20 yards in width through the forest and followed the level floor of the valley wherever practical. Travel along this wide rock-free thoroughfare was a never-ending source of delight after the months of hardships and conflict with the rock-strewn trails of the higher Andes.

Heller Expedition, September 29–October 6, 1915; 33 specimens of 31 species.

Yuvini, near Rio Cosireni (altitude 3,000 feet, humid Tropical Zone).—The Rio Cosireni enters the Urubamba from the southwest some 65 miles in an air-line north by west from Santa Ana. This was one of Heller's two stations in the humid Tropical Zone. Specimens from it are listed under "Rio Cosireni." Heller writes:

Journeying from the village of Lucma northward over the high ridges which bound the Vilcabamba Valley, we drop down at the end of a day's travel into the watershed of the Cosireni River. Following down one of the head streams, the San Miguel, we come to its junction with the Pampaconas River, from which point the Cosireni proper has its origin through the united waters of these two large affluents. Some 6 leagues beyond, farther down the Cosireni, we come to the rubber station of Yuvini, established and managed by a Dane, Alvin Berg. The thatched huts of the station stand on a plateau a few hundred feet above the river, and well back from its margin, for the valley here has a width of a league or more. Flowing past the station and supplying it with water, is a small stream, the Yuvini, which meanders on to its union with the Cosireni 2 miles beyond.

The geographical position of Yuvini is 10 leagues north of Lucma, or more correctly west of north of that place, but by the road it is some 20 leagues, or 3 days' travel by pack train. Yuvini has an altitude of 3,000 feet. At this elevation, the climate is tropical and humid, but the heat here has seldom the oppressive quality which is encountered 1,500 feet lower down the valley.

During our 3 weeks' sojourn here in August and early September, part of each day was overcast by rain squalls and thunder showers of short duration. The air at midday was heavy with moisture, and rain fell at frequent short intervals interspersed by bright intense sunshine. Berg, who had been a resident for 15 years, informed me that this was the usual sort of weather, and that even during the height of the rainy season, some months later, there was seldom a day without some sunshine.

When we arrived in mid-August, the river was clear and low but frequently it became a dark brown flood, and rose rapidly in volume owing to heavy rains in its upper watershed. The suddenness of the rise of such floods and their short duration spoke eloquently of the brevity of the watershed. June and July are said to be the really dry months, when continuous sunshine is the rule. At midday the heat is often intense, but the nights are seldom uncomfortable or hot. Malaria is rare at this particular spot, but this is owing to the absence of mosquitoes, due to the good drainage of the land. From Yuvini you look out upon a wide valley bounded at some distance by gently rounded hills, the whole landscape forest covered without a cliff or rock showing.

Heller Expedition, September 7–13; 18–20; 28, 1915; 46 specimens of 33 species.

Rio Comberciato (altitude 1,800–2,000 feet, humid Tropical Zone).—The Rio Comberciato enters the Urubamba from the northwest some 70 miles west by north of Santa Ana. This was the second of Heller's two stations in the humid Tropical Zone. The collections from this point and the Rio Cosireni (the second tropical station) represent only a small portion of the existing fauna, but are sufficient to show the zonal affinities of the region. Mr. Heller's notes follow:

> Parallelling the Cosireni River in a general way, but lying a few leagues farther north is the Comberciato River which enters the Urubamba at its great bend. The Comberciato has twice the volume of the Cosireni and is much less rapid. The valley through which this stream flows is much deeper and narrower, however, than that of its neighbor, but the river is a series of broad, quiet expanses separated by low, short rapids free of projecting bowlders. The forest covers the whole landscape without any interruptions due to barren rock surfaces or other causes. The hillsides are soil covered like the valley floor.
>
> The lower course of the river where the Yuvini road drops down into the valley, has an altitude of 1,800 feet and this level is maintained for several leagues as we ascend the river. Our highest point on the river was a station called Arroyo at which point a wire cable has been erected by the rubber gatherers for passing their cargoes of rubber. This point is about 4 leagues up the river at the termination of the road and has an altitude of 2,000 feet. Climatically the valley is much warmer than the Yuvini District, owing to its lesser elevation.
>
> At nights there is a continuation of the heat, but little less than in the shade at midday. The river playas or beaches are extensive and wide, the older ones being covered by a growth of tall, spiny bamboo and the newer beaches by glistening white pebbles. A few species of trees occur here which are not found at Yuvini, but the country in general is quite identical to the Cosireni Valley.

Heller Expedition, September 4–6; 13–15; 21–25, 1915.

LIFE ZONES OF THE URUBAMBA VALLEY.

My reconnaissance in the Urubamba Valley and subsequent study of our collections from it have had for their object the determination of the life zones of this section of the Andes and comparison of them with those which we have found to exist in Colombia.

Field experience in the last-named country enabled me to make this comparison in part in the field, while Heller's excellent descriptions of the district visited by him, which I saw only at a distance or did not reach at all, in connection with fairly representative collections, permit me to present at least a provisional report on the subject under consideration.

In general it may be said that the Tropical, Subtropical, and Temperate Zones of the Urubamba district are essentially the Tropical, Subtropical, and Temperate Zones of Colombia; the same altitudinal boundaries and many of the same species being common to both regions. When, however, we compare the Paramo or Puna Zone of the two countries the area occupied by this zone in Peru is so much larger and its distance from the region whence its fauna was presumably derived is so much shorter, that there is a marked difference in the character of its fauna as will be shown beyond.

TROPICAL ZONE.

The Tropical Zone is represented in the Urubamba Valley in both its humid and arid phases. The former, characterized by heavy rainfall and consequently luxuriant forest growth, ascends the valley to the vicinity of Echarati, some 30 miles below Santa Ana. The latter, distinguished by lower rainfall and a xerophytic vegetation of which acacias and cacti are prevailing types, extends up the floor of the valley to about San Miguel Bridge (altitude 6,000 feet), or the lower border of the forests of the Subtropical Zone.

Our stations in the humid Tropical Zone were Rio Cosireni (altitude 3,000 feet) and Rio Comberciato (altitude 1,800–2,000 feet). These were visited only by Heller who secured, as elsewhere mentioned, 74 specimens of 58 species of which 42, not found elsewhere, are characteristic of the humid tropics. This number includes such typical tropical forms as *Tinamus major ruficeps*, *Crypturus soui*, *Penelope jaquaçu*, *Eurypyga major meridionalis*, *Capito auratus insperatus*, *Monasa morphoeus peruana*, *Cephalopterus ornatus*, *Ostinops decumanus maculosus*, etc. While the number of species secured obviously represents only a small part of the existing avifauna, it is sufficient to determine its faunal attributes.

It may also be remarked in passing that this small collection illustrates the uniformity of Tropical Zone life where essentially similar conditions exist, all of the genera and 30 of the 42 characteristic species it contains being found in Colombia.

Our only station in the arid Tropical Zone was Santa Ana, where the hospitality of Senor Duque, rather than the attractions of the fauna, evidently induced Kalinowski as well as the representatives of the Yale University-National Geographic Society to make their headquarters. The Santa Ana Valley is a typical arid pocket such as is found in many places in the Tropical Zone. Though completely isolated from one another, often by wide areas of the humid Tropical Zone, certain species are common to them all, and, as a rule, slight differentiation from type is exhibited. Several subspecies have been described from the Santa Ana Valley, though I do not know that they are restricted to it, but only one species (*Thamnophilus melanochrous*) appears to be peculiar to this district.

The statement of Carlos Duque, quoted by Heller, shows that the settlement of the Santa Ana Valley has been followed by the disappearance of certain species hunted for their flesh, but it is not probable that any very marked change in the fauna has occurred. The rainfall is too small to have produced a forest and crops are grown successfully only under irrigation.

The 66 species recorded from the Santa Ana Valley probably, therefore, fairly represent the original fauna. Of this number, 38, or more than half, are of general distribution throughout Tropical America. Of the remaining 28, no less than 19 are of Brazilian origin. Some of these birds, as *Nothura maculosa*, *Bucco chacuru*, and *Euscarthmus margaritaceiventer*, extend southward to Paraguay and are unknown north of the Amazon, while eight of them range eastward and northward to Guiana. These are: *Hoploxypterus cayanus*, *Ciccaba huhula*, *Eupetomena macroura hirundo* (subspecies Peruvian), *Elaenia cristata*, *Sublegatus fasciatus*, *Myiarchus pelzelni*, *Alopochelidon fucata*, *Coryphospingus cucullatus*. None of these, it is interesting to note, has been recorded from Colombia. There are also several species like *Elaenia gigas*, *Sporophila obscura* and *Piranga testacea* which do not range far from the base of the Andes, but the distinctive avifauna of the arid Tropical Zone of the Santa Ana Valley has evidently been derived through western Brazil and it contains both southern and northern elements.

DISTRIBUTIONAL ANALYSIS OF ARID TROPICAL ZONE BIRDS.

Crypturus parvirostris	Southeastern and central Brazil.
Nothura maculosa peruviana	Southern Brazil to Uruguay; subspecies Peru.
Columba rufina rufina	Tropical South America.
Zenaida auriculata pallens	Southern South America; subspecies Pacific coast to Colombia.
Chamaepelia minuta minuta	Tropical South America.
Leptotila ochroptera ochroptera	Southern and eastern Brazil.
Creciscus viridis facialis	Tropical South America; subspecies Peru.
Hoploxypterus cayanus	Southern Brazil to Guiana.
Helodromas solitarius	North American migrant.
Phalacrocorax vigua vigua	South America generally.
Cathartes atrata	South America generally.
Catharista urubu	South America generally.
Parabuteo unicinctus unicinctus	South America generally.
Cerchneis sparveria, subspecies	South America generally.
Otus choliba	South America generally.
Ciccaba huhula	Brazil to Guiana.
Tyto perlata, subspecies	South America generally.
Ceryle americana	Tropical America generally.
Streptoprocne z. zonaris	South America generally.
Eupetomena macroura hirundo	Brazil to Guiana; subspecies Peru; Bolivia.
Chlorostilbon prasinus daphne	Tropical South America; subspecies Peru to Colombia.
Piaya cayana obscura	Tropical America; subspecies Peru, Bolivia, western Brazil.

Tapera naevia	Tropical South America.
Crotophaga ani	Tropical America.
Bucco chacuru	Brazil to Paraguay.
Ceophloeus lineatus	Tropical South America.
Veniliornis haematostigma hilaris	Bolivia, western Brazil; subspecies Peru.
Thamnophilus melanochrous	Santa Ana region.
Thamnophilus radiatus subradiatus	Tropical South America; subspecies Peru, western Brazil.
Dysithamnus olivaceus	Tropical South America.
Microrhopias rufa rufater	To Bahia, Brazil; subspecies Peru, Bolivia
Cercomacra tyrannina approximans	Tropical America; subspecies Peru, Ecuador, Bolivia, central Brazil.
Synallaxis hypospodia	To Bahia, Brazil.
Muscisaxicola fluviatilis	Peru to Colombia.
Todirostrum cinereum cinereum	Tropical America.
Euscarthmus margaritaceiventer rufipes	Central Brazil to Paraguay; subspecies Peru.
Myiosympotes acutipennis	Colombia to Bolivia.
Elaenia flavogaster	Tropical America.
Elaenia gigas	Colombia to Peru.
Elaenia cristata	Brazil to Guiana and Venezuela, Ecuador, Bolivia, central Brazil.
Myiopagis viridicata	Tropical South America.
Sublegatus f. fasciatus	Argentina to Guiana.
Myiozetetes cayennensis	Tropical South America.
Myiobius fasciatus saturatus	Tropical South America; subspecies Peru.
Empidonax traillí alnorum	North American migrant.
Myiarchus tyrannulus chlorepiscius	Tropical South America; subspecies Peru to Argentina.
Myiarchus pelzelni	Brazil to Guiana.
Tyrannus m. melancholicus	South America generally.
Stelgidopteryx r. ruficollis	Tropical South America; subspecies eastern Colombia to Paraguay.
Alopochelidon fucata	Argentina to Guiana.
Troglodytes musculus audax	South America generally; subspecies Peru.
Vireosylva c. chivi	Tropical South America.
Compsothlypis pitiayumi elegans	Tropical America; subspecies Peru to Venezuela.
Geothlypis aequinoctialis cucullata	Brazil to Argentina.
Sporophila gutturalis inconspicua	Tropical South America; subspecies Peru.
Sporophila obscura	Ecuador to northern Argentina.
Volatinia jacarini jacarini	Tropical America; subspecies Peru, Bolivia, Brazil.
Myospiza aurifrons peruana	Colombia, Peru, western Brazil; subspecies Peru.
Coryphospingus cucullatus	Paraguay to Guiana.
Tanagra laniirostris peruviana	Western Brazil, Bolivia; subspecies Peru.
Thraupis episcopus major	Tropical South America; subspecies Peru.
Thraupis palmarum melanoptera	Western Tropical America.
Ramphocelus carbo connectens	Tropical South America; subspecies Peru, western Brazil.
Piranga testacea tschudi	Central America, western South America; subspecies Peru.
Tachyphonus rufus	Tropical America.
Schistochlamys atra olivina	Tropical South America; subspecies Peru, western Brazil.

SUBTROPICAL ZONE.

The remarkable stratum of life which lies approximately between the elevations of 5,000 and 9,000 feet on the eastern slope of the Andes and extends from Bolivia to Venezuela makes a fold or loop up the Urubamba Valley. In the lower valley its inferior limits merge with the upper border of the humid Tropical Zone in one unbroken sweep of forest; at Santa Ana they are coextensive with the cloud belt below which grassy, treeless slopes reach to the floor of the tropical valley, while from a short distance above San Miguel Bridge (altitude 6,000 feet), at the foot of Machu Picchu, almost to Torontoy, the forests of the Subtropical Zone reach the shores of the river, whence, in places, they extend upward to merge with those of the humid Temperate Zone.

Above Santa Ana the Subtropical Zone is first encountered on the western side of the valley at Idma, and from this point forest extends into the Temperate Zone.

Birds have been collected in the Subtropical Zone of the Urubamba Valley only at Idma and in the Machu Picchu district. From these localities 105 species have been secured which may be considered as zonally representative. Comparison of the results of our work with those of Kalinowski's indicates that this number fairly represents the fauna. It does not, however, fairly represent the fauna of the Subtropical Zone of Peru, since in Colombia we obtained 230 species which were distinctively subtropical. The data at hand, therefore, do not warrant a comparison of the bird life of the Subtropical Zone in Peru and Colombia, but they do show the remarkable uniformity of the life of that zone, a fact to which I have previously called attention.[13] Thus, of 77 genera secured by us in the Subtropical Zone of the Urubamba Valley, no less than 74 also occur in this zone in Colombia; the genera *Knipolegus*, *Phylloscartes*, and *Thlypopsis* being the only ones absent from Colombia. Of the 104 Urubamba species contained in these genera, 57 are common both to Peru and Colombia.

TEMPERATE ZONE.

The Temperate Zone has both a humid and an arid section. The former is found on the more easterly ranges of the Andes, on which are condensed the moisture-bearing winds from the Atlantic. Here well-developed forest reaches an average altitude of 12,500 feet. Above this altitude lies the Puna. The line between the two may be abrupt or the two may merge by an upward extension of bushy-grown areas, the latter forming the arid portion of the Temperate Zone. Heller writes that the forest at Cedrobamba (altitude 12,500 feet) "stops as abruptly as if cut by a knife" and is succeeded by the grassland of the Puna.

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[13] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 135.

At other localities, notably inner valleys with comparatively low rainfall, the Temperate Zone is characterized by a scrubby vegetation restricted largely to the borders of streams, up which the arid portion of the zone extends finger-like projections well into the Puna Zone.

Conditions of this kind can be understood only by one who has observed them in the field. They can not be expressed by the most careful labeling of specimens. A collection from Ttica-Ttica (altitude 11,900 feet), for example, contains a mixture of forms apparently not susceptible of zonal interpretation. With such characteristic species of the Puna as *Upucerthia pallida, Geositta tenuirostris, Agriornis solitaria insolens, Muscisaxicola rufivertex*, etc., there are presumably associated *Anaeretes flavirostris, Serpophaga cinerea, Elaenia albiceps, Saltator albociliaris, Diglossa brunneiventris*, etc., but in the field it was found that the first group was largely restricted to the grassy slopes, while the second was found only in the narrow fringe of bushes at the borders of streams.

The collection from Cedrobamba contains a similarly confusing assemblage of Temperate and Puna Zone forms, the occurrence of which within a restricted area is explained by Heller's description of the striking conditions which exist at that locality. The upper limit of the Temperate Zone, therefore, coincides with the upper limit of tree or bush growth, and this may often be at a higher altitude than the lower limit of the succeeding or Puna Zone.

On the eastern slopes of the Andes the lower limits of the Temperate Zone correspond with the upper limits of the Subtropical Zone, and although forest may stretch continuously from timberline to the Amazonian plains, the limit between the two zones is here uniformly about 9,000 feet. Where, however, lack of rain prevents the development of the forest which so strongly distinguishes the Subtropical Zone, the Temperate Zone in its arid phase may descend much lower. In the Urubamba Valley it reaches Torontoy at 8,000 feet and on the treeless Pacific slope of the Andes it actually descends to sea level. The influence exerted by the Humboldt current must, however, be taken into consideration here, an inquiry which would lead us far beyond the scope of this paper.

The assemblage of species characterizing the Temperate Zone is intensely interesting. Being either tree or bush inhabiting, it is clear that they must have had their geographic origin in tree or bush-grown regions. The humid South Temperate Zone is separated from the district under consideration by 1,500 miles of treeless country, which has proved an effective barrier to the northward extension of the forest-inhabiting species of southern Chile.[14]

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[14] *Scytalopus* is an exception; but it is not improbable that *Scytalopus* originated in the mountains of southeastern Brazil where its present isolation from the Andean forms is paralleled among trees by *Araucaria*.

It seems evident, therefore, that the avifauna of the Temperate Zone can have originated only in the forested regions lying below it, and in its parrots, humming birds, toucans, trogons, flycatchers, tanagers, and honey creepers it is evident that we have the highly differentiated descendants of tropical forms.

The area occupied by the Temperate Zone is by no means so large as that of the Subtropical Zone and the number of species inhabiting it is correspondingly small. But analysis shows that the bird life of the Temperate Zone is more distinct than that of any other zone.

Of the species known from the Urubamba region 70 may be accredited to the Temperate Zone. Of these, seven are wide-ranging species not zonally characteristic. Examples are *Falco fuscocærulescens, Tyto perlata, Serpophaga cinerea.* The remaining 63 species represent 44 genera of which 4 genera are of general distribution, 8 Tropical, 1 Andean and southeast Brazil, 1 Andean Temperate and South Temperate, 2 Subtropical and Temperate, while 28 of these genera, or nearly two-thirds the total number, are restricted to the Andean Temperate Zone.

Of the 63 characteristic species which we collected, no less than 56 are Andean Temperate, 7 are Subtropical and Temperate, while 6 of the latter are represented in the Temperate Zone by subspecies which are peculiar to it.

This remarkable degree of specialization becomes even more noteworthy when the avifauna of the Temperate Zone is compared with that of the Puna Zone. Comment on it may, therefore, be preceded by consideration of Puna Zone bird life.

DISTRIBUTIONAL ANALYSIS OF TEMPERATE ZONE BIRDS.

Columba albipennis	Genus cosmopolitan; species Temperate Zone.
Columba albilinea	Genus cosmopolitan; species Subtropical and Temperate Zones.
Merganetta leucogenys	Temperate Zone, genus and species.
Aratinga mitrata alticola	Genus Tropical; subspecies Temperate.
Amoropsittaca andicola	Genus Tropical; species Temperate.
Thermochalcis ruficervix	Genus Tropical; species Temperate.
Micropus parvulus	Genus cosmopolitan; species Temperate.
Micropus montivagans	Genus cosmopolitan; species Subtropical and Temperate Zones.
Aglaeactis castelnaudi	Genus and species Temperate Zone.
Heliangelus amethysticollis	Genus and species Temperate Zone.
Metallura s. smaragdinicollis	Genus and species Temperate Zone.
Oreonympha nobilis	Genus and species Temperate Zone.
Chalcostigma stanleyi vulcani	Genus and species Temperate Zone.
Chalcostigma olivaceum	Genus and species Temperate Zone.
Psalidoprymna nuna	Genus and species Temperate Zone.
Scytalopus acutirostris	Genus Andean, southeast Brazil; species Temperate Zone.

Scytalopus, species	Genus Andean, southeast Brazil; species Temperate Zone.
Grallaria erythroleuca	Genus Tropical; species Temperate Zone.
Hylopezus rufula obscura	Genus and species Temperate Zone.
Schizoeaca palpebralis	Genus and species Temperate Zone.
Margarornis perlata	Genus Subtropical and Temperate; species Temperate Zone.
Ochthoeca fumicolor berlepschi	Genus and species Temperate Zone.
Ochthoeca leucophrys leucometopa	Genus and species Temperate Zone.
Ochthoeca frontalis spodionota	Genus and species Temperate Zone.
Ochthoeca lessoni tectricialis	Genus and species Temperate Zone.
Ochthoeca thoracica	Genus and species Temperate Zone.
Mecocerculus leucophrys setophagoides	Genus and species Temperate Zone.
Mecocerculus stictopterus taeniopterus	Genus and species Temperate Zone.
Caenotriccus ruficeps	Genus and species Temperate Zone.
Anaeretes flavirostris	Genus Temperate and South Temperate; species Andean.
Anaeretes agraphia	Genus Temperate and South Temperate; species Andean.
Elaenia albiceps, subspecies	Genus Tropical; subspecies Temperate Zone.
Heliochera rubrocristata	Genus and species Temperate Zone.
Troglodytes musculus puna	Genus Western Hemisphere; subspecies Andean Temperate Zone.
Troglodytes solstitialis macrourus	Genus Western Hemisphere; subspecies Andean Temperate Zone.
Semimerula gigas gigantodes	Genus and species Temperate Zone.
Semimerula chiguanco	Genus and species Temperate Zone.
Basileuterus luteoviridis superciliaris	Genus Tropical; subspecies Temperate Zone.
Catamenia i. inornata	Genus and species Temperate Zone.
Catamenia analoides griseiventris	Genus and species Temperate Zone.
Spinus ictericus peruvianus	Genus cosmopolitan; subspecies Temperate Zone.
Poospizopsis caesar	Genus and species Temperate Zone.
Atlapetes canigenis	Genus Subtropical and Temperate; species Temperate Zone.
Diglossa brunneiventris	Genus and species Temperate Zone.
Diglossa mystacalis albilinea	Genus and species Temperate Zone
Diglossa personata melanopis	Genus and species Temperate Zone.
Oreomanes fraseri	Genus and species Temperate Zone.
Conirostrum cyaneum	Genus and species Temperate Zone
Conirostrum ferrugineiventris	Genus and species Temperate Zone.
Conirostrum c. cinereum	Genus and species Temperate Zone.
Xenodacnis parina	Genus and species Temperate Zone.
Iridosornis j. jelskii	Genus and species Temperate Zone.
Poecilothraupis igniventris	Genus and species Temperate Zone.
Buthraupis cucullata saturata	Genus and species Temperate Zone.
Dubusia stictocephala	Genus and species Temperate Zone.
Thraupis darwini laeta	Genus Tropical; subspecies Temperate Zone.
Hemispingus atropileus auricularis	Genus and species Temperate Zone.
Hemispingus superciliaris nigrifrons	Genus and species Temperate Zone.
Pseudospingus xanthophthalmus	Genus and species Temperate Zone.
Microspingus trifasciatus	Genus and species Temperate Zone.
Cyanolyca jolyaea	Genus and species Temperate Zone.
Cyanolyca viridicyanea cuzcoensis	Genus and species Temperate Zone.

SUMMARY OF DISTRIBUTIONAL ANALYSIS OF 51 GENERA AND 70 SPECIES TAKEN IN THE TEMPERATE ZONE.[16]

GENERA.

Of general distribution	11
Of South Temperate Zone origin	1
Andean and southeastern Brazil	1
Tropical	8
Restricted to Subtropical and Temperate Zones	2
Restricted to the Temperate Zone	28
Total	51

SPECIES.

Of general distribution	7
Restricted to the Subtropical and Temperate Zones	7
Restricted to the Temperate Zone	56
Total	70

PUNA OR PARAMO ZONE.

The Puna of Peru corresponds to the Paramo of Colombia. Both regions lie between the upper limit of arborescent vegetation and the lower limit of snow. On the eastern Andes in the Urubamba region, this is approximately between the altitudes of 12,500 and 15,000 feet,[16] limits which agree with those we found to exist in the Central Andes of Colombia.

Faunally, however, where insufficient rainfall prohibits forest growth, the Puna Zone reaches a much lower level. As stated previously, at Ttica-Ttica (altitude 11,900 feet), near Cuzco, it completely inosculates with the upper border of the arid Temperate Zone. The two zones are here distinguished by the presence or absence of bushy vegetation, a difference controlled wholly by water supply. Much additional field work is required to determine the interrelations of these zones. Since the bird life of the Puna has been derived largely from the South Temperate Zone in Patagonia it may prove to be desirable to characterize the Puna as an Andean Temperate and apply a new name for the forested and bush-grown Zone which I have here termed Temperate. This problem, however, can not be treated from a local standpoint, nor indeed do data as yet exist for its solution.

In Colombia the flora of the Paramo with its frailejons and other striking species, is so characteristic that no difficulty is experienced in distinguishing Temperate Zone savanna from the Paramo above it. But the uniformly grass-covered plains and slopes and the marshes of the Puna afford no such obvious boundaries.

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[15] In Colombia we found some 70 genera and somewhat over 100 species characteristic of the Temperate Zone. I can not say whether the excess in number over those found in Peru is actual or due to an incomplete knowledge of Peruvian bird life, but note that even our local collecting in the Urubamba Region reveals the much more highly developed Puna or Paramo fauna of Peru.

[16] See Bowman, the Andes of southern Peru, p. 274.

No doubt, however, can exist as to the origin of the Puna avifauna. Suited only for the needs of plain, marsh, and water-inhabiting species, Puna bird life has been largely derived from the vast area of plains, marsh, and lakes which, without topographic barrier, bounds it on the south and extends nearly to the southern limits of the continent.

The South Temperate Zone ducks and grebes find a suitable home on the Puna lakes, where they are represented by permanently resident races, while the oven-birds (Furnariidae) and finches of Patagonia find congenial haunts and climatic conditions on the high Andean table-land.[17]

Subtracting from the 58 genera found by us on the Puna, 27 of general distribution (as *Spatula, Phalacrocorax, Falco, Anthus*, etc.), and we have left 31 genera, of which 19 are of the South Temperate Zone, while only 7 are peculiar to the Puna. Compare these figures with those given for the Temperate Zone and it is seen that the latter owes practically nothing to the South Temperate Zone, while it has a far larger proportion of endemic genera. Thus, of the genera found by us in the Puna Zone, slightly more, than 7 per cent are endemic, while of those found in the Temperate Zone 55 per cent are endemic.

Continuing the comparison with the species found in the two zones, it is seen that somewhat more than 57 per cent of Puna Zone species are endemic, while of Temperate Zone species 80 per cent are endemic.

The most obvious reason for the much greater differentiation of the life of the Temperate Zone as compared with that of the Puna Zone is apparently to be found in the geographic origin of their respective faunas. That of the Temperate Zone, as we have seen, presumably originated in the Tropical Zone, that of the Puna in the South Temperate Zone. The former has consequently been subjected to the influences of the wide climatic differences lying between the Tropical and Temperate Zones, the latter has found in the Puna Zone a climate not radically different from that in which we assume it originated.

It is probable that the life of the Temperate Zone, having doubtless passed through a Subtropical Zone stage, is older than that of the Puna. This, however, is one of the many problems connected with the origin of Andean life which we are not as yet in a position to attack. I restrict myself therefore to the comparison which clearly reveals the great distinctness of Temperate Zone bird life, and repeat my belief that this distinctness is not primarily dependent upon the age of the fauna, but mainly to the influence of the marked climatic differences existing between the Tropical and Temperate Zones.

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[17] If the entire known avifauna of Peru were here under review due consideration would of course be given the Limicolae, Flamingoes, Rheas, and other Puna birds of which we secured no specimens.

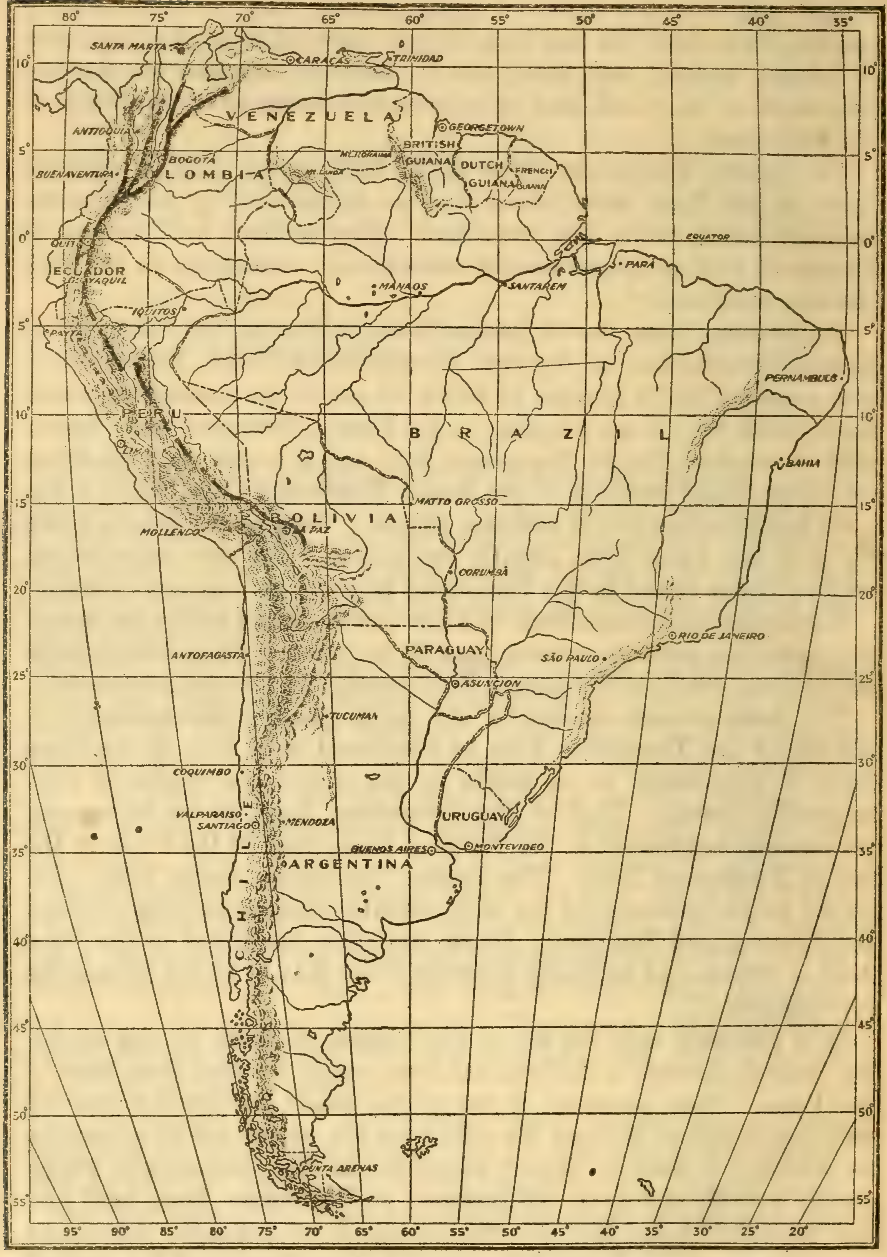

FIG. 2.—SEMI-DIAGRAMMATIC REPRESENTATION OF THE RANGE OF HELIOCHERA, A VERY DISTINCT COTINGINE GENUS RESTRICTED TO THE FORESTS OF THE HUMID TEMPERATE ZONE, WHICH HAS PRESUMABLY BEEN DERIVED FROM A FOREST-INHABITING ANCESTOR OF THE HUMID TROPICAL ZONE AT THE BASE OF THE ANDES. THE HUMID TEMPERATE ZONE FOREST, AND HENCE THE DISTRIBUTION OF THE GENUS, IS DOUBTLESS LESS CONTINUOUS THAN IS HERE INDICATED.

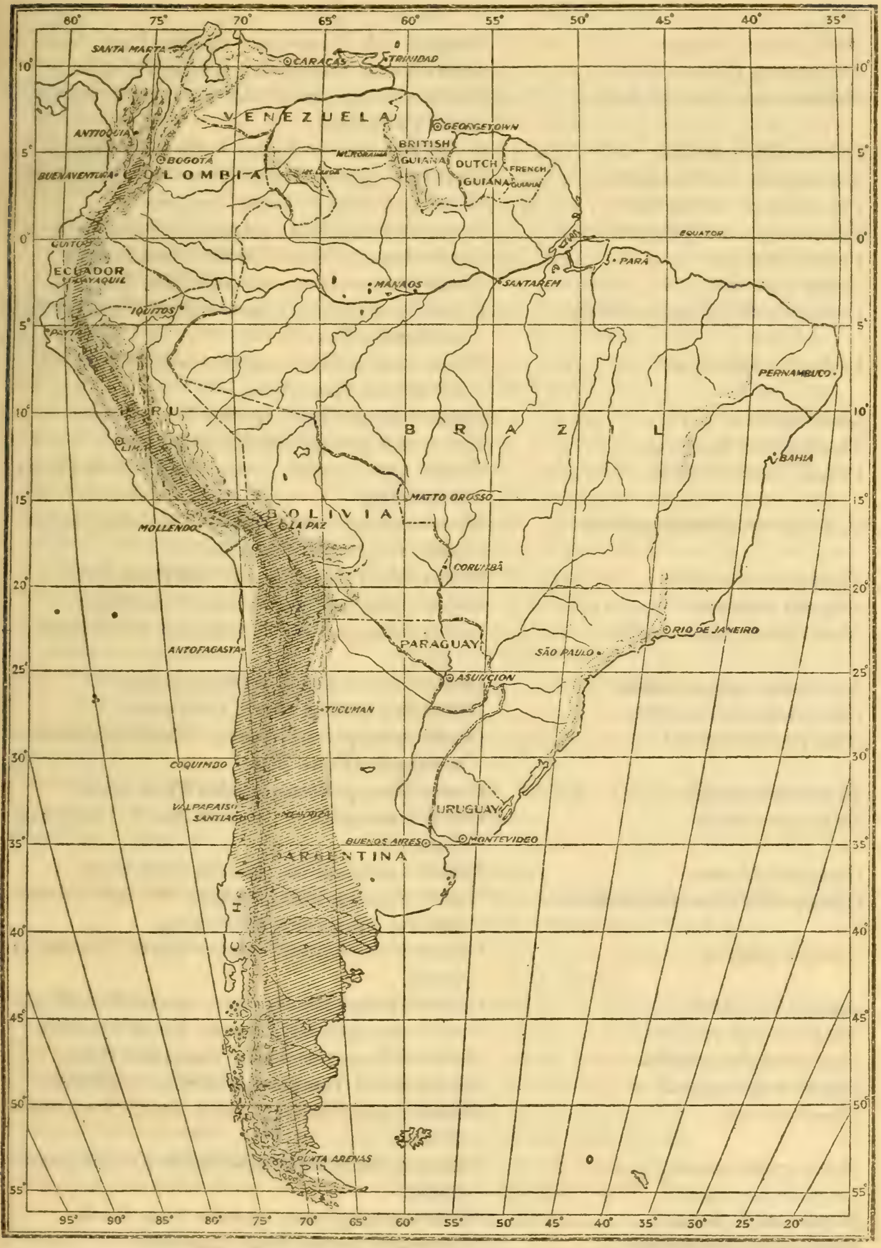

FIG. 3.—SEMI-DIAGRAMMATIC REPRESENTATION OF THE RANGE OF UPUCERTHIA, A GENUS OF THE TREELESS SOUTH TEMPERATE ZONE, WHICH HAS EXTENDED ITS RANGE FROM PATAGONIA TO COLOMBIA OVER THE TREELESS PUNA OR PARAMO ZONE OF THE ANDES. COMPARE WITH MAP SHOWING RANGE OF THE GENUS HELIOCHERA, WHERE THE MARKED ENVIRONMENTAL DIFFERENCES BETWEEN TROPICAL AND TEMPERATE FORESTS, SEPARATED BY BUT FEW MILES, ARE BELIEVED TO HAVE RESULTED IN THE DEVELOPMENT OF THE DISTINCT TYPES CHARACTERIZING THE HUMID TEMPERATE ZONE, WHILE SPECIES OF THE PATAGONIAN PLAINS RANGE 4,000 MILES NORTHWARD OVER HIGH ANDEAN PLAINS WITH ONLY SLIGHT DIFFERENTIATION.

DISTRIBUTIONAL ANALYSIS OF PUNA ZONE BIRDS.

Nothoprocta fulvescens	Genus South Temperate; species Puna Zone.
Nothoprocta kalinowskii	Genus South Temperate; species Puna Zone.
Nothura maculosa boliviana	Genus and species South Temperate; subspecies Puna Zone.
Gymnopelia c. ceciliae	Genus and species Puna; Peru to Argentina.
Metriopelia m. melanoptera	Genus and species Puna; Ecuador to Argentina.
Pardirallus r. rytirhynchus	Genus and species South Temperate.
Gallinula galeata garmani	Genus cosmopolitan; subspecies Puna Zone.
Fulica ardesiaca	Genus cosmopolitan; species Puna Zone.
Fulica gigantea	Genus cosmopolitan; species Puna Zone.
Podiceps callipareus juninensis	Genus cosmopolitan; species South Temperate; subspecies Puna Zone.
Podiceps americanus	Genus cosmopolitan; species South Temperate; subspecies Puna Zone.
Larus serranus	Genus cosmopolitan; species Puna Zone.
Thinocorus orbignyanus	Genus and species South Temperate.
Ptiloscelys resplendens	Genus and species Puna Zone, Ecuador to Argentina.
Gallinago braziliensis andina	Genus cosmopolitan; species Brazil and Argentina; subspecies Puna Zone.
Theristicus branickii	Genus South America; species Puna Zone.
Plegadis ridgwayi	Genus cosmopolitan; species Puna Zone.
Nycticorax n. tayazu-guira	Genus cosmopolitan; subspecies South American.
Nycticorax cyanocephalus	Genus cosmopolitan; species Chilean.
Chloephaga melanoptera	Genus and species South Temperate.
Anas cristata alticola	Genus cosmopolitan; species South Temperate; subspecies Puna Zone.
Nettion oxypterum	Genus cosmopolitan; species Puna Zone.
Dafila spinicauda	Genus cosmopolitan; species South Temperate Zone.
Querquedula puna	Genus cosmopolitan; species Puna Zone.
Querquedula cyanoptera orinomus	Genus cosmopolitan; species Western Hemisphere; subspecies Puna Zone.
Spatula platalea	Genus cosmopolitan; species South Temperate Zone.
Oxyura ferruginea	Genus Western Hemisphere; species Puna Zone.
Phalacrocorax v. vigua	Genus cosmopolitan; species South America.
Sarcorhamphus gryphus	Genus and species South Temperate Zone.
Ibycter megalopterus	Genus South Temperate; species Puna Zone.
Circus cinereus	Genus cosmopolitan; species South Temperate Zone.
Buteo erythronotus	Genus cosmopolitan; species South Temperate Zone.
Buteo poecilochrous	Genus cosmopolitan; species Puna Zone.
Spiziastur melanoleucus	Genus and species South America.
Falco fusco-caerulescens	Genus cosmopolitan; species South America.
Cerchneis sparveria, subspecies	Genus Western Hemisphere; species American.
Speotyto cunicularia juninensis	Genus and species Western Hemisphere; subspecies Puna Zone.
Pterophanes cyanopterus	Genus and species Puna Zone.
Vestipedes sapphiropygia	Genus Temperate and Puna; species Puna Zone.
Metallura aeneocauda	Genus Temperate and Puna; species Puna Zone.

Patagona gigas	Genus and species Puna Zone; South Temperate Zone in Chile.
Oreotrochilus estella	Genus and species Puna Zone.
Colaptes puna	Genus Western Hemisphere; species Puna Zone.
Geositta tenuirostris	Genus South Temperate; species Puna Zone.
Upucerthia pallida	Genus South Temperate; species Puna Zone.
Cinclodes fuscus rivularis	Genus and species South Temperate; subspecies Puna Zone.
Cinclodes atacamensis	Genus South Temperate; species Puna Zone.
Leptasthenura andicola peruviana	Genus South Temperate; species Puna Zone.
Leptasthenura pileata	Genus South Temperate; species Puna Zone.
Siptornis albicapilla	Genus South Temperate; species Puna Zone.
Siptornis modesta proxima	Genus South Temperate; species Puna Zone.
Siptornis ottonis	Genus South Temperate; species Puna Zone.
Siptornis graminicola	Genus South Temperate; species Puna Zone.
Siptornis urubambensis	Genus South Temperate; species Puna Zone.
Phacellodomus striaticeps griseipectus	Genus North Argentina; species Puna Zone.
Agriornis pollens	Genus South Temperate; species Puna Zone.
Agriornis solitaria insolens	Genus South Temperate; species Puna Zone.
Myiotheretes erythropygius	Genus South Temperate; species Puna Zone.
Ochthoeca oenanthoides polionota	Genus Andean Temperate; species Puna Zone.
Muscisaxicola albifrons	Genus South Temperate; species Puna Zone.
Muscisaxicola grisea	Genus South Temperate; species Puna Zone.
Muscisaxicola albilora	Genus South Temperate; species Puna Zone.
Muscisaxicola rufivertex	Genus South Temperate; species Puna Zone.
Muscisaxicola maculirostris	Genus South Temperate; species South Temperate.
Lessonia niger oreas	Genus and species South Temperate; subspecies Puna Zone.
Orochelidon murina	Genus and species Andean Temperate and Puna Zones.
Orochelidon andecola	Genus and species Andean Temperate and Puna Zones.
Cistothorus platensis graminicola	Genus Western Hemisphere; species South Temperate; subspecies Puna Zone.
Anthus bogotensis immaculatus	Genus cosmopolitan; species Andean Temperate and Puna Zones.
Anthus furcatus	Genus cosmopolitan; species South Temperate.
Spinus atratus	Genus cosmopolitan; species Puna Zone.
Sycalis arvensis	Genus and species South America.
Brachyspiza c. peruviana	Genus and species South Temperate; subspecies Western South America.
Pseudochloris olivascens chloris	Genus and species Puna Zone.
Pseudochloris uropygialis connectens	Genus and species Puna Zone.
Phrygilus gayi punensis	Genus and species South Temperate; subspecies Puna Zone.
Phrygilus fruticeti	Genus South Temperate; species South Temperate Zone.
Phrygilus unicolor unicolor	Genus South Temperate; species South Temperate Zone.
Phrygilus alaudinus	Genus South Temperate; species Puna Zone.
Phrygilus plebejus	Genus South Temperate; species Puna Zone.
Diuca speculifera	Genus South Temperate; species Puna Zone.
Agelaius thilius	Genus Western Hemisphere; species South Temperate Zone.

SUMMARY OF DISTRIBUTIONAL ANALYSIS OF 58 GENERA AND 82 SPECIES TAKEN IN THE PUMA ZONE.[13]

GENERA.

Of general distribution	27
Of South Temperate Zone origin	19
Of Argentine origin	1
Restricted to the Temperate and Puna Zones	4
Restricted to the Puna Zone	7
Total	58

SPECIES.

Of general distribution	10
Found also in the South Temperate Zone	22
Found also in Chile	1
Restricted to the Temperate and Puna Zones	3
Restricted to the Puna Zone	46
Total	82

NORTH AMERICAN MIGRANTS.

The coast and the lakes and marshes of the tableland of Peru form the winter home or migration stations for a number of North American shore birds. Taczanowski records some 28 species, but of land birds comparatively few reach this country, only 15 being given by Taczanowski.

Our work having been done largely in the summer months we took comparatively few of these migrants. *Totanus melanoleucus* is recorded from Tinta and Tungasuca by Sclater and Salvin, *Helodromas solitarius* from Santa Ana by Berlepsch and Stolzmann, while Watkins secured two male Spotted Sandpipers at Calca, near Cuzco, on April 25, one of which had the sexual organs much enlarged.

The following North American land birds are recorded beyond:

Empidonax trailli alnorum.
Vireosylva olivacea.
Dendroica caerulea.
Wilsonia canadensis.
Piranga rubra rubra.

LIST OF SPECIES AND SUBSPECIES IN THE URUBAMBA COLLECTIONS WHICH HAVE BEEN DESCRIBED AS NEW.

Micropus peruvianus, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 253 (Ollantaytambo), =*Micropus parvulus* Berlepsch and Stolzmann.

Leptasthenura andicola peruviana, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 327 (La Raya).

Siptornis urubambensis, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 328 (Cedrobamba).

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[13] The richness of the Puna Zone avifauna of Peru as compared with that of Colombia is shown by the statement that only 15 genera and 18 species were found by us in the Paramo or Puna Zone of the last-named country. This comparatively limited life is due to the small extent of the area contained within the zone and also to its remoteness from the region in which Puna birds have their geographic origin.

Phacellodomus striaticeps griseipectus, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 258 (Ttica-Ttica).

Mecocerculus subtropicalis, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 263 (San Miguel Bridge).

Anaeretes agraphia, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 263 (Idma).

Basileuterus luteoviridis superciliaris, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 265 (above Torontoy).

Pheucticus uropygialis terminalis, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 266 (San Miguel Bridge).

Pseudochloris uropygialis connectens, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 329 (La Raya).

Catamenia analoides griseiventris, Proc. Biol. Soc. Wash., 1919, p. 267 (Cuzco).

Atlapetes canigenis, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 330 (Torontoy).

Diglossa mystacalis albilinea, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 331 (Cedrobamba).

Oreomanes binghami, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 331 (Cedrobamba) =*Oreomanes fraseri* Sclater.

LIST OF SUBSPECIES DESCRIBED IN THIS PAPER.

Aratinga mitrata alticola, p. 62.
Siptornis modesta proxima, p. 83.
Ochthoeca lessoni tectricialis, p. 88.

DISTRIBUTIONAL LIST OF 380 SPECIES AND SUBSPECIES OF BIRDS KNOWN FROM THE URUBAMBA VALLEY.

This paper is offered primarily as a contribution to a biological survey of the Andean system. Such value as it may possess is to be found chiefly in the results of a comparative study of the origin of the bird life of the Temperate and Puna Zones from which our collections, if not complete, are at least fairly representative.

As a preliminary to the end in view it was necessary only that the identity of our specimens—constituting, as it were, the factors in the local problem under consideration—be determined and expressed in terms of current nomenclature. So far as possible I have, therefore, restricted my systematic work to the specimens contained in the collection. The fact, furthermore, that the American Museum, in the prosecution of its biological survey of South America, is now engaged in work in Peru makes it desirable to await the receipt of much additional material before attempting anything like revisions of the groups to which the species herein listed belong.

Failure to recognize genera recently described or recorded by various authors does not necessarily mean disapproval of their views. Generic subdivision in ornithology nowadays is so unstandardized and, in many cases, is so largely a matter of opinion, that it seems unwise to change long-established terms until opportunity has been afforded to weigh the evidence on which the new or revived genera in question are recognized.

Faunal papers treating of a small part of the known species of birds may be regarded as catalogues, rather than expositions of classification. To facilitate their use, particularly when as "extras" they appear without indices, their authors should, in my opinion, adopt a current, standard classification, even when it does not wholly embody their own views. I have, therefore, followed here Sharpe's order of arrangement as it is employed by Brabourne and Chubb in their Birds of South America, using also the enumeration of species given in that work. The addition of a letter to a number indicates that the species in question is not contained in Brabourne and Chubb's list.

Ridgway's Color Standards and Color Nomenclature (Washington, 1912) has been accepted as authoritative.

When no specimens are listed it is understood that the species is ncluded on the authority cited.

DISTRIBUTIONAL SUMMARY.

	Number of species.
Of general distribution	15
North American migrants	8
Tropical Zone	115
Subtropical Zone	105
Temperate Zone	63
Puna or Paramo Zone	74
Total	380

Order CRYPTURIFORMES.

Family TINAMIDAE.

TINAMOUS.

(4) TINAMUS TAO Temminck.

Tinamus tao Temminck, Pig. et Gallin., vol. 3, 1815, pp. 569, 749 ("Para, Bresil").

No comparison made with other specimens.

Rio Comberciato, 1 male; Rio Cosireni, 1 male; Rio San Miguel, 1 male, 1 female.

(7) TINAMUS MAJOR RUFICEPS Sclater and Salvin.

Tinamus ruficeps Sclater and Salvin, Nomen. Av. Neotr., 1873, p. 162 (Rio Napo, Ec.).

A male and female from the Rio Cosireni agree in color with average specimens from Colombia, but have a shorter wing, measuring, respectively, wing, 200 and 205 mm. as compared with an average of 230 mm. in the Colombian bird.

Rio Cosireni, 2.

(23) CRYPTURUS SOUI, subspecies.

Two males from the Rio Comberciato and a female from the Rio Cosireni represent an apparently undescribed race of this widely distributed and variable species. This material is not, however, in my opinion, sufficient to define satisfactorily the status and relationships of a Peruvian form, and rather than add to the confusion which already exists in this group I prefer to await the receipt of additional specimens before presenting my conclusions in this connection. Meanwhile it may be said that the males, one of which (Sept. 13) is marked as "breeding" are much grayer, less fulvous below than the males of any race known to me, while the female (Sept. 11) which is also marked as breeding, resembles in general coloration males from the island of Trinidad, but has the lower tail-coverts more rufous.

Rio Comberciato, 2; Rio Cosireni, 1.

(26) CRYPTURUS PARVIROSTRIS Wagler.

Crypturus parvirostris Wagler, Syst. Av. Gen. *Crypturus*, sp. 13, 1827 (Brazil).—Berlepsch and Stolzmann, Ornis, 1906, p. 101 (Santa Ana).

A female collected by Cherrie at Santa Ana compared with three males from Chapada, Matto Grosso, is darker above with the crown slaty, rather than brownish, and the underparts decidedly more slaty. These differences may be in part sexual but are doubtless also in part racial.

Brabourne and Chubb [19] have proposed to place this species and *C. tataupa* in a new genus for which they propose the name *Crypturellus*. Later [20] Chubb, discovering that this name was preoccupied, replaced it with *Microcrypturus;* but in 1919, Ibis, p. 10, he continued to use *Crypturellus*. The characters ascribed to the new genus, however, seem at the best to be of not more than subgeneric value and in my opinion the species mentioned may be retained in the genus *Crypturus*.

Santa Ana, 1.

(49) NOTHOPROCTA FULVESCENS Berlepsch.

Nothoprocta fulvescens Berlepsch Proc. 5th Int. Zool. Cong., 1902, p. 548 (Urcos, 3500 m., Dept. Cuzco, Peru).

I refer to this species, of which I have seen only the original description, two not fully mature specimens collected by Heller at Ollantaytambo. They have the flanks and abdominal region fulvous, as in *N. curvirostris*, but the secondaries are barred with rich fulvous, not with ferruginous as in that species, *N. perdicaria*, and *N. coquimbae*.

Ollantaytambo, 2.

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[19] Ann. Mag. Nat. Hist., vol. 14, 1914, p. 322.

[20] Bull. Brit. Orn. Club., vol. 38, 1917, p. 30, under *Crypturus obsoletus punensis*.

(59) NOTHOPROCTA KALINOWSKII Berlepsch and Stolzmann.

Nothoprocta kalinowskii Berlepsch and Stolzmann, Ornis, 1901, p. 104; 1906, p. 104 (Licomachay near Cuzco).

(61) NOTHURA MACULOSA PERUVIANA Berlepsch and Stolzmann.

Nothura maculosa peruviana Berlepsch and Stolzmann, Ornis, 1906, p. 101 (Santa Ana, Peru).

(63) NOTHURA MACULOSA BOLIVIANA Salvadori.

Nothura boliviana Salvadori, Cat. Birds Brit. Mus., vol. 27, 1895, p. 561 (Bolivia).

Nothura maculosa boliviana Berlepsch and Stolzmann, Ornis, 1906, p. 105 (Cuzco).

Order GALLIFORMES.

Family CRACIDAE.

CURASSOWS, GUANS, CHACHALACAS.

(92) PENELOPE SCLATERI PLUMOSA Berlepsch and Stolzmann.

Penelope sclateri plumosa Berlepsch and Stolzmann, Proc. Zool. Soc., 1902, p. 44 (Maraynioc, Peru).

Differs from Bolivian specimens as described by Berlepsch and Stolzmann.

Torontoy, 7,800–9,000 feet, 7.

(98) PENELOPE JACQUAÇU JACQUAÇU Spix.

Penelope jacquaçu Spix, Av. Bras., vol. 2, 1825, p. 52, pl. lxviii (Solimoëns).

Four specimens from the Tropical Zone agree with four from southeastern Colombia, and one from the Lower Beni, but two from the Rio Chimoré (1,300 feet, Prov. Cochabamba, Bolivia), have the malar stripe grayer, the crown feathers longer, more pointed and more widely bordered with gray; the wing coverts more widely margined with silvery white, and the rump greener. They thus agree with the description of *Penelope speciosa* Todd. It is difficult to believe, however, that the differences noted are more than subspecific when it seems probable that *speciosa* will prove to be the same as *P. boliviana* Reichenbach.

Rio Comberciato, 2 (one, Sept. 25, breeding); Rio Cosireni, 1 (Aug. 30, breeding); San Fernando, 1 (Sept. 20, breeding).

(112) ORTALIS GUTTATA (Spix).

Penelope guttata Spix, Av. Bras., vol. 2, 1825, p. 55, pl. lxxii (Solimoëns).

Ortalis guttata adspersa Berlepsch and Stolzmann, Ornis, 1906, p. 100 (Idma, 1 female).

Two males from the Rio Cosireni have the throat and breast darker with the margins to the feathers whiter and more clearly defined than in examples from southeastern Colombia. Should the difference be constant they should be known as *Ortalis guttata adspersus* (Tschudi).

Rio Cosireni, 2 (1, Oct. 20, "breeding").

(116) PIPILE CUMANENSIS (Jacquin).

Crax cumanensis JACQUIN, Beytr. Gesch. Vögel, 1784, p. 25, pl. 10 (Orinoco).

This widely distributed bird of the Tropical Zone, is represented by four specimens collected by Heller between September 4 and 25, and marked by him as "breeding." I have no topotypical specimens for comparison.

Rio Comberciato, 4.

(121) ABURRIA ABURRI (Lesson).

Penelope aburri LESSON, Dict. Sci. Nat., vol. 59, 1829, p. 191 (Bogotá).
Aburria aburri BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Idma).

Two females agree with others from Bogotá, but are slightly smaller.

Rio Cosireni, 1; Rio San Miguel, 1, breeding (Sept. 29).

Family ODONTOPHORIDAE.

AMERICAN QUAILS AND PARTRIDGES.

(140) ODONTOPHORUS STELLATUS (Gould).

Ortyx stellata GOULD, Proc. Zool. Soc., 1842, p. 183 (Brazil).

An immature female is apparently to be referred to this species.

Rio Cosireni, 1.

Order COLUMBIFORMES.

Family COLUMBIDAE.

PIGEONS AND DOVES.

(147) COLUMBA ALBIPENNIS Sclater.

Columba albipennis SCLATER, Proc. Zool. Soc., 1876, p. 18 (Pitumarca, Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 104 (Cuzco).

Ollantaytambo, 3 (1 breeding, Aug. 10).

(152) COLUMBA RUFINA RUFINA Temminck and Knip.

Columba rufina TEMMINCK and KNIP, Pig., Proc., vol. 1, 1808–1811, p. 59, pl. 24 (French Guiana).
Columba rufina SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Maranura).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Santa Ana., Idma).

I am unable to separate three specimens from Peru and two from Bolivia from a Colombian series. The under tail coverts average darker but the difference is slight and bridged by individual variation, two of the Peruvian and one of the Bolivian birds having the under tail coverts quite as pale as in eastern Colombian example.

Santa Ana, 2; Idma, 1.

(154) COLUMBA ALBILINEA ALBILINEA Bonaparte.

Columba albilinea BONAPARTE, Consp. Av., vol. 2, 1854, p. 51 (New Granada).

Two of our four specimens are adult and agree with Colombia examples.

Occobamba Valley, 3; above Torontoy (altitude 9,500 feet), 1.

(156a) COLUMBA PLUMBEA PROPINQUA Cory.

Columba plumbea propinqua CORY, Field Mus. Pub. 182, 1915, p. 205 (Moyobamba, Peru).

Columba plumbea andicola CHUBB, Ibis, 1919, p. 33 (Central Peru to Bolivia).

A male from the Rio Comberciato and another from Santo Domingo, southeastern Peru, agree and apparently are not separable from a specimen from Buena Vista, eastern Colombia, labeled by Ridgway *C. plumbea propinqua* Cory. Mr. Chubb appears to have overlooked this race in his remarks on the forms of this species[21], as well as late publications on the same subject by Ridgway[22], and Chapman.[23]

Rio Comberciato, 1.

(162) ZENAIDA AURICULATA PALLENS Bangs and Noble.

Zenaida auriculata pallens BANGS and NOBLE, Auk, 1918, p. 446 (Huancabamba, Peru).

This wide-ranging species is found from the Tropical up to the Temperate Zone. Specimens from the coast and tableland, both in Peru and Ecuador, are apparently alike and hence should be referred to this recently described race, the relationships of which with *Z. hypoleuca* Bonaparte remain to be determined. On the other hand, three males from the Cauca Valley, Colombia, agree with an equal number from Chile in having the chin scarcely lighter than the breast, the color of the latter extending backward to the vent with but little buff. The lower tail coverts in the Cauca birds, however, are more vinaceous than in those from Chile. Some Bolivian birds (Prov. Cochabamba) resemble Chilean examples; others are like those from Peru. Two adult males from Buenos Aires are paler, more glaucous below than any of those above mentioned, while a male from Chapada, Matto Grosso, Brazil, agrees in color and size with two others from Fernando Noronha off the coast of Brazil.[24]

Unquestionably this species may properly be divided into several races, but their satisfactory definition requires more material than is at present available.

Santa Ana, 1; Ollantaytambo, 2; Huaracondo, 2; Cuzco, 1; Pisac, 6.

(170) GYMNOPELIA CECILIAE CECILIAE (Lesson).

Columba (*Chamoepelia*) *ceciliae* LESSON, Echo du Monde Sav., Jan. 12, 1845, col. 8 (Peru).

Chamaepelia erythrothorax SCLATER and SALVIN, Proc. Zool. Soc., 1869. p. 155 (Tinta).

Found by us in the arid Temperate and Puna Zones. It is interesting to observe that specimens from La Raya are referable to the present form, while a series from Tirapata, 60 miles farther south, agrees with the Bolivian race *G. c. gymnops*, which has been characterized by Chubb.

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[21] Ibis, 1919, pp. 31-33.

[22] Birds of Middle and North America, vol. 7, 1916, pp. 324, 325.

[23] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, pp. 203-206.

[24] *Zenaida auriculata noronha* Chubb (Gray MS.), Ibis, 1919, p. 36.

Ollantaytambo, 3; Chospiyoc, 2 (Apr. 15, 21, breeding); Huaracondo, 4; Cuzco, 4; La Raya, 6.

(176) CHAEMEPELIA MINUTA MINUTA (Linnaeus).

Columba minuta LINNAEUS, Syst. Nat., vol. 1, 1766, p. 285 (Cayenne).

Chamaepelia griseola SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Maranura).

Columbigallina minuta BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Santa Ana).

Inhabits the Tropical Zone.

Santa Ana, 6; Idma, 2.

(187) METRIOPELIA MELANOPTERA MELANOPTERA (Molina).

Columba melanoptera MOLINA, Hist. Nat. Chile, 1782, p. 308 (Chile).

Metriopelia melanoptera SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

Restricted to the Puna Zone. Our specimens agree with a series from Tofo, Chile, and show no approach to the well-marked Ecuadorian form *M. m. saturatior* Chubb.

La Raya, 1; Pisac, 2.

(194) LEPTOTILA OCHROPTERA OCHROPTERA (Pelzeln).

Leptoptila ochroptera PELZELN, Orn. Bras., 1871, pp. 278, 451 (Sapitiba).—SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Potrero; Huiro).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Santa Ana).

Inhabits the Tropical Zone ranging upward to the Subtropical. An excellent series agrees in color with three specimens from Paraguay (Rio Negro and Fort Wheeler) which I assume represent *chloroauchenia*, but the Peruvian birds are slightly smaller and should, I suppose, be referred to *ochroptera*. I have not, however, topotypical specimens of the last-named form and this identification must therefore be considered as provisional.

Santa Ana, 7; Idma, 1; San Miguel Bridge, 4; Machu Picchu, 1; Torontoy, 2.

(204) OREOPELEIA MONTANA (Linnaeus).

Columba montana LINNAEUS, Syst. Nat., vol. 1, 1758, p. 163 (Jamaica).

A wide-ranging Tropical Zone species.

Rio Cosireni, 1 (Aug. 27, breeding).

(208) OREOPELEIA FRENATA (Tschudi).

Columba frenata TSCHUDI, Arch. für Naturg., vol. 1, 1843, p. 386 (E. Peru).

Geotrygon frenata BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Idma).

Rio San Miguel, 2 (1 breeding, Sept. 29).

Order RALLIFORMES.

Family RALLIDAE.

RAILS, GALLINULES, COOTS.

(221) PARDIRALLUS RYTIRHYNCHUS RYTIRHYNCHUS (Vieillot).

Rallus rytirhynchus VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 28, 1819, p. 549 (Paraguay).

Pardirallus rytirhynchus rytirhynchus BANGS and NOBLE, Auk, 1918, p. 446 (Huancabamba, Peru).

Pardirallus rityrhynchus tschudii CHUBB, Ibis, 1919, p. 50 (central Peru; type from Lake Junin).

An excellent series of 19 specimens from northern Argentina, which may be considered as doubtless typically representing this species, shows some interesting differences in coloration and indicates that recently proposed forms of this species are apparently based on individual rather than racial variation. The dorsal surface in these specimens varies from plain, uniform olive-brown of varying shades, to essentially the same or somewhat paler color mottled with blackish, especially posteriorly. This blackish mottling is largely due to a wearing away of the tips of the feathers which exposes their blackish bases, but it is also individual, since some worn specimens, which are at the beginning of the postnuptial molt, do not exhibit it. The same range of variation is shown in five specimens from the Temperate Zone of Peru (including three from Lake Junin, type locality of *P. r. tschudii* Chubb). These specimens are somewhat larger than those from Argentina, but the difference is not in my opinion sufficiently pronounced to be of diagnostic value.

La Raya, 1; Calca, 1.

(231) ARAMIDES CAJANEA CHIRICOTE (Vieillot).

Rallus chiricote VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 28, 1819, p. 551 (Paraguay).

A species of the Tropical Zone. Our specimen agrees with seven from Matto Grosso, Brazil.

Rio Comberciato, 1.

(252) CRECISCUS VIRIDIS FACIALIS (Tschudi).

Crex facialis TSCHUDI, Arch. für Naturg., 1843, p. 388 ("in sylvis peruanis calidris").

Creciscus viridis facialis BERLEPSCH and STOLZMANN, Ornis, 1906, p. 102 (Santa Ana).

(256) GALLINULA GALEATA GARMANI Allen.

Gallinula garmani ALLEN, Bull. Mus. Comp. Zool., 1876, p. 357 (Lake Titicaca).

A Puna Zone representative of this wide-ranging species.

Calca, 1.

(261) FULICA ARDESIACA Tschudi.

Fulica ardesiaca Tschudi, Arch. für Naturg., 1843, vol. 1, p. 389 (Peru).—Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tungasuca).

(263) FULICA GIGANTEA Eydoux and Souleyet.

Fulica gigantea Eydoux and Souleyet, Voy. *Bonite*, 1841, p. 102, pl. 8 (Peru).

Restricted to the Puna Zone.

La Raya, 1.

Order PODICIPEDIFORMES.

Family PODICIPEDIDAE.

GREBES.

(269) PODICEPS AMERICANUS Garnot.

Podiceps americanus Garnot, Voy. *Coquille*, Zool., vol. 1, 1829, p. 599 (Chile).

Podiceps rollandi Sclater and Salvin, Proc. Zool. Soc., 1869, p. 158 (Tungasuca).

(272) PODICEPS CALLIPARAEUS JUNINENSIS Berlepsch and Stolzmann.

P. calliparaeus juninensis Berlepsch and Stolzmann, Ibis, 1894, p, 112, prov. descr. (Lake Junin, Peru).

Podiceps calipareus Sclater and Salvin, Proc. Zool. Soc., 1869, p. 158 (Tungasuca).

Comparison of 13 specimens from Puno, 6 from Lake Junin, and 3 from La Raya, with 2 birds in breeding plumage from the Falkland Islands, confirms the subspecific distinctness of the race inhabiting the Puna Zone of Peru. Titicaca specimens average slightly larger than those from Junin and La Raya birds seem to be somewhat larger than either.

La Raya, 2 males, 1 female.

Order LARIFORMES.

Family LARIDAE.

SKIMMERS, GULLS, SKUAS.

(341) LARUS SERRANUS Tschudi.

Larus serranus Tschudi, Archiv für Naturg., 1844, vol. 1, p. 314 (Peru).—Sclater and Salvin, Proc. Zool. Soc., 1869, p. 158 (Tinta).

An abundant species of the Puna Zone, descending the streams to the Subtropical Zone.

Ollantaytambo, 1; San Miguel Bridge, 1.

Order CHARADRIIFORMES.

Family THINOCORYTHIDAE.

SEED-SNIPE.

(359) THINOCORUS ORBIGNYANUS Geoffroy and Lesson.

Tinochorus orbignyanus Geoffroy and Lesson, Cent. Zool., 1832, p. 137, pls. 48, 49 ("San-Yago, Chili").

I have no Chilean material for comparison.

Occobamba Pass (13000 feet) above Ollantaytambo, 1 male, 2 females.

Family CHARADRIIDAE.

PLOVERS, SNIPES, Etc.

(369) HOPLOXYPTERUS CAYANUS (Latham).

Charadrius cayanus Latham, Ind. Orn., vol. 2, 1790, p. 749 (Cayenne).

Hoploxypterus cayanus Berlepsch and Stolzmann, Ornis, 1906, p. 102 (Santa Ana).

(370) PTILOSCELYS RESPLENDENS (Tschudi).

Charadrius resplendens Tschudi, Arch. für Naturg., 1843, p. 388 ("Antium incola," Peru).

Vanellus resplendens Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tinta).

Common in and peculiar to the Puna Zone.

Lucma, 1 female.

(397) TOTANUS MELANOLEUCUS (Gmelin).

Scolopax melanoleuca Gmelin, Syst. Nat., vol. 1, 1789, p. 659 (Labrador).

Gambetta melanoleuca Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tinta; Tungasuca).

(399) HELODROMAS SOLITARIUS (Wilson).

Tringa solitaria Wilson, Amer. Orn., vol. 7, 1813, p. 53, pl. 58, fig. 3 (probably Pennsylvania).

Helodromas solitarius Berlepsch and Stolzmann, Ornis, 1906, p. 102 (Santa Ana, 2 males, Sept.).

I am unable to say whether the two specimens recorded by Berlepsch and Stolzmann are referable to the eastern or western form.

(400) ACTITIS MACULARIA (Linnaeus).

Tringa macularia Linnaeus, Syst. Nat., vol. 1, 1766, p. 249 (Pennsylvania).

Tringoides macularius Berlepsch and Stolzmann, Ornis, 1906, p. 102 (Santa Ana, Dec.).

Rio Comberciato, 1 female juv., Sept. 22, molting into first winter plumage; Calca, 1 male, Apl. 25 "testes much enlarged," 1 male, Apl. 25, "testes slightly enlarged," both in nuptial plumage.

(415) GALLINAGO BRAZILIENSIS ANDINA (Taczanowski).

Scolopax andina Taczanowski, Proc. Zool. Soc., 1874, p. 561 (Lake Junin, Peru).

Gallinago frenata Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tungasuca).

Gallinago andina Sclater and Salvin, Proc. Zool. Soc., 1876, p. 19 (Crit.).

These specimens agree with four others from Lake Junin.

La Raya, 1; Ttica-Ttica, 1.

Order GRUIFORMES.

Family EURYPYGIDAE.

SUN-BITTERNS.

(435) EURYPYGA MAJOR MERIDIONALIS Berlepsch and Stolzmann.

Eurypyga major meridionalis Berlepsch and Stolzmann, Proc. Zool. Soc., 1902, p. 50 (La Merced, Peru).

Compared with five specimens from Panama, and one from Chocó, Colombia, two Peruvian birds support, in part, the characters on which this race is based. The russet banding on the outer primary is evidently variable in the same locality and not diagnostic, but the narrower black bands of the back, and clearer, more distinct markings on the neck seem to distinguish the Peruvian form.

Rio Cosireni, 1; (also Inca Mine, 1).

Order ARDEIFORMES.

Family IBIDIDAE.

IBISES.

(446) THERISTICUS BRANICKII Berlepsch and Stolzmann.

Theristicus branickii Berlepsch and Stolzmann, Ibis, 1894, p. 404 (Lake Junin, Peru); 1900, pls. 9, 10.

Agrees with two specimens from Lake Junin.

Occobamba Pass, 14,000 feet, 1 male.

(454) PLEGADIS RIDGWAYI (Allen).

Falcinellus ridgwayi Allen, Bull. Mus. Comp. Zool., vol. 3, 1876, p. 355 (Lake Titicaca).

Ibis falcinellus Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tungasuca)

Common in lagoons in the Puna Zone near the village of Huaracondo. No specimens were taken.

Family ARDEIDAE.

HERONS, BITTERNS, Etc.

(463) HERODIAS EGRETTA (Gmelin).

Ardea egretta Gmelin, Syst. Nat., vol. 1, 1789, p. 629 (Cayenne).—Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tungasuca).

(470) NYCTICORAX NYCTICORAX TAYAZU-GUIRA (Vieillot).

Ardea tayazu-guira Vieillot, Nouv. Dict. d'Hist. Nat., vol 14, 1817, p. 417 (Paraguay).

(471) NYCTICORAX CYANOCEPHALUS (Molina).

Ardea cyanocephala Molina, Saggio St. Chile, 1782, p. 156 (Chile).

Nycticorax obscurus Sclater and Salvin, Proc. Zool. Soc., 1869, p. 156 (Tinta).

The night herons of southern South America have long perplexed taxonomists, and with some 30 specimens before me I confess that I am no more able to reach wholly satisfactory results than have been my predecessors. It is evident, however, from the material at hand, that there are two well-marked forms, a light and a dark. The dark form appears to be the only one found in Chile, where it ranges from the Straits of Magellan region northward. The light form appears to be the only one found east of the Andes, where it ranges from the Falkland Islands north, at least, to northern Argentina. Thus far the case seems clear, but when we reach the Andean table-land it is complicated by the occurrence of both forms, and what appears to be intergrades between them, from at least the vicinity of Cochabamba, Bolivia, to Lake Junin, Peru.

This intergradation is not a gradual merging of one form into another, since typical specimens of both dark and light forms were secured at the same place, within two days of each other, as appears from the appended consideration of table-land specimens.

Bolivia.—Vinto, 8,600 feet, Province Cochabamba. An unsexed, immature specimen taken July 7, streaked above and below, represents the dark form and resembles in size and color a bird of the same age from Ancud, Chile. The ground color below is ochraceous broadly streaked with black; the upper parts are blackish streaked with ochraceous.

Peru.—Puno, Lake Titicaca. A fully adult male with long nuptial plumes and enlarged sexual organs, taken July 26, is intermediate between *cyanocephalus* and *naevius* in color, but agrees with the former in size. (Wing, 319 mm.). It agrees very nearly with a male in similar stage of plumage from the Falkland Islands. An immature female, taken August 26, is typical of the light form and agrees in color and size with a specimen from Tafi del Valle, Province Tucuman, Argentina.

La Raya, 14,000 feet (about midway between Puno and Cuzco). A nearly adult male taken April 10, in much worn plumage and undergoing a complete molt into adult plumage, can be matched by specimens from Jujuy, Argentina, which are but slightly darker than average examples of *naevius* from the United States. An adult male in full molt, taken April 8, at La Raya, is fairly typical of the dark form and agrees essentially in color and in size with a bird of the same age from Temuco, Chile. Consequently we have from La Raya, taken within two days of each other, fairly typical specimens of *tayazu-guira* and *cyanocephalus*.

A nearly adult female in full molt, taken April 22 at Calca, in the Cuzco region, is typical of the light form and agrees with the La Raya female just mentioned. A young male taken March 13, at Junin is typical of the light form, while and adult male taken on the same day at the same place is intermediate between the light and dark forms. It is slightly darker than the intermediate specimen from Puno, but very near a Falkland Island bird. Additional specimens, and particularly field studies, are needed to determine satisfactorily the status of these herons on the table-land of Bolivia and Peru, but the material examined in this connection (see list of specimens under table of measurements) shows, as stated above, the existence of a dark form in Chile and of a somewhat variable [25] light form in the Falkland Islands and Argentina, and doubtless Paraguay, Uruguay, and southern Brazil. The former has long been known as *Nycticorax cyanocephalus*, the latter has stood as *Nycticorax tayazu-guira* until 1914, when Mr. Hartert,[26] stating that Paraguayan birds were referable to *naevius*, applied that name to all the mainland birds east of the Andes and described the Falkland Island bird as *Nycticorax cyanocephalus falklandicus*.

I have no specimens from Paraguay, but it is not probable that they would differ materially from those in our excellent series from northern Argentina. Some of the latter can be matched by dark specimens of *naevius* from the United States, nevertheless it is quite evident that they belong to the form of *naevius* which inhabits southern South America, east of the Andes, for which Vieillot's name *tayazu-guira*, founded on Paraguay specimens through Azara, is available. To this form I refer Falkland Island as well as Titicaca and Lake Junin specimens. In other words, I follow Sharpe [27] rather than Hartert. As shown above, adults from the Falklands are essentially like adults from Peru, while an immature Falkland bird can be matched by one from Jujuy, Argentina. In other words, the Falkland Island bird can not be separated from the light-colored mainland form either by color or by size. It is equally clear that, in spite of its variability, there is but one light-colored form of the Night Heron in southern South America, where it ranges from at least Lake Junin to the Falkland Islands, specimens from these two localities, as well as from Lake Titicaca being inseparable.

The relationships of the light form (*tayazu-guira*) to the dark form (*cyanocephalus*) are in doubt, but our specimens establish the fact that both occur together on the Peruvian tableland, where also intermediates between them are found. It is not impossible that the dark coloration is a partial dichromatism, constant in Chile, occasional on the tableland, and shown in a lesser degree by certain specimens from Peru, Argentina, and the Falklands. Since writing the above we have received an adult night heron from Panama, which is nearly as dark as Chilean specimens.

In size, the wing and tail average longer in the dark form. This difference is well shown by the two males from La Raya, one of which is an extreme example of the light form, while the other is typical of the dark form. A male from the Falklands, however, is as large as some and but slightly smaller than other Chilean birds, while in two females from the Falklands the wing is shorter than in Chilean birds, but not quite so short as in Argentine specimens. In the length of the tarsus and bill there appear to be no diagnostic differences in size.

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[25] Almost as much variation is shown by *naevius* in the United States.

[26] Bull. Brit. Orn. Club, vol. 35, 1914, p. 15.

[27] Cat. Birds Brit. Mus., vol. 26, pp. 155, 156.

Measurements of males.

	Wing.	Tail.	Tarsus.	Bill.
Bertrand Island, Chile, immature [1]	317	129	82	77
Do.[1]	310	126	81	75
Temuco, Chile, immature [1]	323	121	86	67.5
Ancud, Chile, immature [1]	322	118	85	71.5
Do.[1]	314	115	80	74
Falkland Island, adult [2]	312	120	90	78
Perico, Jujuy, immature [2]	290	117	80	72
Perico, Jujuy, adult [2]	305	116	83	75
Puno, adult [2]	319	129	82	77
La Raya, adult [2]	292	118	74	72
Do.[1]	308	134	81	73
Junin, adult [2]	307	130	83	77
Junin, immature [2]	298	113	87	74

[1] *Cyanocephalus.* [2] *Tayazu-guira.*

Measurements of females.

	Wing.	Tail.	Tarsus.	Bill.
Bertrand Island, Chile, immature [1]	310	128	77	70
Do.[1]	310	125	83	72
Do.[1]	316	127	79	72
Straits of Magellan, immature [1]	300	120	77	71
Temuco, immature [1]	320	127	83	73
Temuco, adult [1]	313	118	81	67
Do.[1]	318	123	80	70
Falkland Island, immature [2]	295	115	77	71
Falkland Island, adult [2]	296	106	80	71.5
Tafi del Valle, Tucuman, immature [2]	280	101	78	66
Embarcacion, Salta, immature [2]	285	99	78	68
Vinto, Bolivia, immature [1]	311	117	83	67
Puno, Titicaca, immature [2]	298	120	87	75
Calca, Peru, adult [2]	289	119	77	70

[1] *Cyanocephalus.* [2] *Tayazu-guira.*

(483) TIGRISOMA SALMONI Sclater and Salvin.

Tigrisoma salmoni SCLATER and SALVIN, Proc. Zool. Soc., 1875, p. 38 (Lower Cauca River, Col.).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 102 (Idma).

Order ANSERIFORMES.

Family ANATIDAE.

DUCKS, GEESE, SWANS.

(501) CHLOËPHAGA MELANOPTERA (Eyton).

Anser melanopterus Eyton, Monog. Anat., 1838, p. 93 (Lake Titicaca).
Bernicla melanoptera Sclater and Salvin, Proc. Zool. Soc., 1869, p. 157 (Pitumarca; Tinta).

Common in the Puna Zone.

Occobamba Pass, 14,000 feet, 1 male (July 25, mated); La Raya, 1 female.

(513) ANAS CRISTATA ALTICOLA Menegaux.

Anas cristata alticola Menegaux, Bull. Soc. Philom. Paris, vol. 10, 1909, p. 224 (Lake Poopo, Bolivia).

Compared with a large series from the Magellan region, Peruvian specimens confirm the validity of this race.

Cedrobamba, 13,000 feet, 1 male (breeding June 4). (We have also four specimens from Lake Junin.)

(517) NETTION OXYPTERUM (Meyen).

Anas oxyptera Meyen, Nov. Act., vol. 16, 1833, Suppl., p. 121, pl. 26 (southern Peru).
Querquedula oxyptera Sclater and Salvin, Proc. Zool. Soc., 1869, p. 157 (Tungasuca; Tinta).

Occobamba Pass, 1 male.

(521) DAFILA SPINICAUDA (Vieillot).

Anas spinicauda Vieillot, Nouv. Dict. d'Hist. Nat., 1816, p. 135 (Buenos Aires).
Dafila spinicauda Sclater and Salvin, Proc. Zool. Soc., 1869, p. 157 (Tungasuca; Tinta).

(524) QUERQUEDULA PUNA (Tschudi).

Anas puna Tschudi, Arch. für Naturg., 1844, p. 315 (Peru).
Querquedula puna Sclater and Salvin, Proc. Zool. Soc., 1869, p. 157 (Tungasuca).

(527) QUERQUEDULA CYANOPTERA ORINOMUS Oberholser.

Querquedula orinomus Oberholser, Proc. Biol. Soc. Wash., 1906, p. 93 (Puna, Lake Titicaca).
Querquedula cyanoptera Sclater and Salvin, Proc. Zool. Soc., 1876, p. 17 (Tungasuca).

(529) SPATULA PLATALEA (Vieillot).

Anas platalea Vieillot, Nouv. Dict. d'Hist. Nat., vol. 5, 1816, p. 157 (Buenos Aires).
Spatula platalea Sclater and Salvin, Proc. Zool. Soc., 1876, p. 17 (Tungasuca).

(537) OXYURA FERRUGINEA (Eyton).

Erismatura ferruginea Eyton, Monog. Anat., 1838, p. 70 (Chile).—Berlepsch and Stolzmann, Ornis, 1906, p. 105 (Vilcabamba).

La Raya, 1 male.

(545) MERGANETTA LEUCOGENYS LEUCOGENYS (Tschudi).

Anas leucogenis Tschudi, Arch. für Naturg., 1843, vol. 1, p. 390 (Andes of Peru).
Merganetta leucogenys Sclater and Salvin, 1869, p. 157 (Tinta).

Common in the streams of the Temperate Zone; less common in the Subtropical Zone. The female differs from the female of the Columbian species in the vermiculations of the sides of the neck, as described by Taczanowski. A pair seen July 22, in the Huaracondo Canyon were accompanied by two young in the down.

Occobamba Valley, 9,100 ft., 1 male, 1 female (mated); Lucma, 11,000 feet, 1 female; Huaracondo Canyon, 10,000 feet, 1 male, 1 female, 2 young (one family).

Order PELECANIFORMES.

Family PHALACROCORACIDAE.

CORMORANTS.

(549) PHALACROCORAX VIGUA VIGUA (Vieillot).

Hydrocorax vigua Vieillot, Nouv. Dict. d'Hist. Nat., vol. 8, 1817, p. 90 (Paraguay).
Phalacrocorax brasilianus Sclater and Salvin, Proc. Zool. Soc., 1876, p. 17 (Tungasuca).
Phalacrocorax vigua Berlepsch and Stolzmann, Ornis, 1906, p. 102 (Santa Ana),

Noted on the Urubamba between Santa Ana and Chauillay Bridge.

Order CATHARTIFORMES.

Family CATHARTIDAE.

CONDORS, VULTURES.

(565) SARCORAMPHUS GRYPHUS (Linnaeus).

Vultur gryphus Linnaeus, Syst. Nat., vol. 1, 1758, p. 12 (Chile).

Two condors were observed soaring high over the Urubamba River several miles above San Miguel Bridge. At Colpani, at the upper border of the arid Tropics, one was observed only a few hundred feet above the river, the condor, the black vulture, and turkey vulture all being observed at practically the same altitude on that day (July 9).

(567) CATHARISTA URUBU (Vieillot).

Vultur urubu Vieillot, Ois. Amer. Sept., vol. 1, 1807, p. 23, pl. 2. (Carolina and Florida).

Observed in the arid Tropics of the Santa Ana region. No specimens secured.

(568) CATHARTES AURA (subspecies?).

Vultur aura Linnaeus, Syst. Nat., vol. 1, 1758, p. 86 (America calidiore).

Observed in the arid Tropics. No specimens taken.

Order ACCIPITRIFORMES.

Family FALCONIDAE.

CARACARAS, FALCONS, HAWKS, Etc.

(576) IBYCTER MEGALOPTERUS (Meyen).

Aquila megaloptera MEYEN, Nov. Act. Caes., vol. 16, Suppl. 1, 1834, p. 64, pl. 7 (Chile).

Milvago megalopterus SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

Inhabits the Puna Zone.

Above Torontoy, 14,000 feet, 1 male; Lucma, 13,000 feet, 1 male.

(583) CIRCUS CINEREUS Vieillot.

Circus cinereus VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 4, 1816, p. 454 (Paraguay).—SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

Ttica-Ttica, 1 male adult.

(593) PARABUTEO UNICINCTUS (Temminck).

Falco unicinctus TEMMINCK, Pl. Col., vol. 1, 1824, pl. 313 (Brazil).

Antenor unicinctus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Santa Ana).

(615) BUTEO ERYTHRONOTUS (King).

Haliaetus erythronotus, KING, Zool. Journ., vol. 3, 1827, p. 424 (Straits Magellan).

Buteo erythronotus SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

We did not secure this species in the Urubamba region but in identifying the specimens of *Buteo poecilochrous* mentioned later, I have had occasion to examine our remaining specimens of this group from Puno, Lake Titicaca and southward to the Falkland Islands, and conclude that they are all referable to *Buteo erythronotus*. The series includes adults, or nearly adult birds, which are unmistakably *erythronotus*, from Puno, Lake Titicaca, Tofo, 60 miles north of Coquimbo, Chile; Tafi del Valle, Province Tucuman, Argentina; Uspallata Pass above Mendoza, Argentina, and the Falkland Islands. The remaining specimens present much variation due to age and dichromatism. Generally speaking, immature birds, in what I assume is postjuvenal plumage (first year) are broadly *streaked* below with black, or dark brown, the upper parts are fuscous with a minimum amount of ochraceous, the tail is dark gray narrowly and evenly barred with black, with no broader subterminal bar. In the succeeding plumage (second year) only the throat and breast are streaked, the abdominal region being thickly covered with broad, sometimes confluent ferruginous bars; there is usually more ochraceous or ferruginous in the dorsal surface, and at least a trace of a broad subterminal bar in some of the rectrices. In the following plumage (third year) the streaks have largely or wholly disappeared from the white breast, leaving the abdomen as in the preceding plumage; the ferruginous in the back has increased, in some specimens occupying the greater part of the dorsal surface much as in the adult, the subterminal tail bar is nearly if not quite as broad as in the adult, the rectrices are white, narrowly but evenly barred with blackish. This is followed by the fully adult plumage with white underparts, the bars, if any, confined to the sides and flanks, the tail white with broken bars or none, except a broad subterminal band, the back practically solid ferruginous. All but the tail-characters may be obscured by partial or complete melanism or erythrism. Thus an individual which has the tail of the postjuvenal plumage, is elsewhere almost wholly black, while two nearly adult birds from Puno and one from Tafi del Valle have the throat, breast and tibiae dark slate, the abdominal region rich chestnut more or less obscured with blackish in two specimens, in which the ferruginous above is also obscured with black. These comments are based on a series of 24 females. Apparently similar changes occur in the male, but my series of seven specimens of which singularly enough four are adult with white underparts and gray back, is too small to warrant a definite statement in this respect.

The series as a whole indicates that *erythronotus* is never wholly gray below and if this be true it seems evident that the relationships of *poliosomus* are with the *poecilochrous-hypospodius* group of which it may be the southern representative.

Measurements of Buteo erythronotus.

Place.	Sex and age.	Wing.	Tail.
Puno, Peru	Male adult	355	188
Tafi del Valle, Province of Tucuman, Argentina.	Male, first year	390	228
Do	do	362	220
Do	Male, third year	363	207
Mendoza, Argentina	Male, adult	365	193
Tofo, Chile	do	363	192
Falkland Islands	do	363	193
Puno, Peru	Female, first year	402	234
Do	Female, third year	418	238
Do	Female, adult, melan.	397	215
Do	do	404	211
Tafi del Valle, Province of Tucuman, Argentina.	Female, first year	388	235
Do	do	409	236
Do	do	402	242
Do	do	408	244
Do	Female, first year, melan.	410	238
Do	Female, second year	388	219
Do	do	399	224
Do	Female, third year	406	225
Do	Female, adult	417	228
Mendoza, Argentina	Female, first year	384	237
Do	Female, second year	383	219
Do	do	394	224
Tofo, Chile	Female, adult	392	200
Do	do	377	204
Santa Cruz, Argentina	Female, second year	393	230
Tierra del Fuego	Female, third year	400	232
Falkland Islands	Female, second year, melan.	404	220

(618) BUTEO POECILOCHROUS Gurney.

Buteo poecilochrous GURNEY, Ibis, 1879, p. 176 (Yanayacu, Ecuador).
Buteo melanosternus BERLEPSCH and STOLZMANN, Ornis, vol. 13, 1906, p. 104 (Cuzco).

No two of four hawks from La Raya are quite alike, nevertheless it is evident that they represent but one species. They agree in size with the measurements given for *poecilochrous* and an adult female agrees minutely with Gurney's description of that bird. A second female is mixed rufous and brown above with the abdominal region nearly uniform dark brown, the breast more ochraceous, the throat streaked with blackish, the tail gray, inner vanes of outer feathers and both vanes of central feathers whiter, all marked with wavy, darker gray bars which are more regular on the lateral feathers. The third female is apparently more adult, being intermediate between the one just described and the bird resembling Gurney's type. The male agrees with Gurney's plate of *Buteo hypospodius* [28] but has the lower abdomen and tibiae barred with gray and white, the throat white narrowly streaked with gray. An adult male from Mount Chimborazo, Ecuador, agrees closely with Gurney's plate in color but resembles the La Raya bird in size (see measurements that follow). If, as I assume, it represents the fully adult male of *poecilochrous* it is to be distinguished from the adult male of *hypospodius* only by its larger size.

Measurements of Buteo poecilochrous.

Place.	Sex and age.	Wing.	Tail.
Chimborazo, Ecuador	Male adult	420	217
La Raya, Peru	.....do	410	216
"Chile"	.....do	419	224
La Raya, Peru	Female, adult	468	247
Do	Female, second year	447	247
Do	Female, third year	478	253

(626) RUPORNIS MAGNIROSTRIS OCCIDUA Bangs.

Rupornis magnirostris occidua BANGS, Proc. Biol. Soc. Wash., vol. 24, 1911, p. 187 (Rio Tambopata, Peru).
Rupornis nattereri BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Santa Ana).

These birds are intermediate between *magnirostris* and *nattereri*. They are in molt, the older plumage being brownish much as in *nattereri*, while the ingrowing plumage is grayer and more like that of *magnirostris*. The female is as gray below as the grayest *magnirostris* while the male has as much cinnamon on the chest and bars of the underparts as in some specimens of *nattereri* from Chapada, Matto Grosso.

Rio Comberciato, 1 male, 1 female.

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[28] Ibis, 1876, pl. 3.

(650) SPIZIASTUR MELANOLEUCUS (Vieillot).

Spizaëtus melanoleucus VIEILLOT, Nouv. Dict. d'Hist. Nat., 1816, vol. 4, p. 482 (Guiana).

Geranoaëtus melanoleucus SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tungasuca).

(658) CHONDROHIERAX UNCINATUS (Temminck).

Falco uncinatus TEMMINCK, Pl. Col., vol. 1, 1824, pls. 103–105 (Rio Janeiro).

Leptodon uncinatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Echarate).

Idma, 1 female.

(669) FALCO FUSCO-CAERULESCENS Vieillot.

Falco fusco-caerulescens VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 11, 1817, p. 90 (Paraguay).

Hypotriorchis femoralis SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

La Raya, female adult.

(677) CERCHNEIS SPARVERIA subspecies.

Tinnunculus sparverius SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta); 1876, p. 17 (Maranura; Potrero).

Tinnunculus sparverius cinnamominus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 100 (Santa Ana).

The sparrow hawk ranges from the Tropical Zone to the Puna and is everywhere more or less common. Pending a revision of the forms of this species, for which we have been some time securing specimens, I make no attempt to determine subspecifically the following examples.

Santa Ana, 1 female; Torontoy, 1 female; Ollantaytambo, 3 males, 3 females; Chospiyoc, 1 female; Ttica-Ttica, 1 male, 1 female; Calca, 1 male; Cuzco, 1 male, 2 females.

Order STRIGIFORMES.

Family BUBONIDAE.

OWLS.

(684) BUBO VIRGINIANUS NACURUTU (Vieillot).

Strix nacurutu VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 7, 1817, p. 44 (Paraguay).

Bubo virginianus SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

Two specimens appear to be inseparable from a male from Corumbá, Brazil, and a female from Fort Wheeler, Paraguay, both of which may be considered as topotypical of *nacurutu*. These four birds are quite unlike three from the Straits of Magellan region (Tierra del Fuego, London Island, Rio Gallegos). The latter have the black markings, especially of the upper parts, of greater extent more intense and without a brownish tinge, the ochraceous markings much paler and less extensive and the pattern above much finer, the vermiculations smaller. This material, therefore, evidently represents two well-marked races, for which Vieillot's name is applicable to the more northern.

Ttica-Ttica, 1; Ollantaytambo, 1.

(691-692) OTUS CHOLIBA (Vieillot).

Strix choliba VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 7, 1817, p. 39 (Paraguay).
Pisorhina choliba BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Santa Ana).

Found only in the Tropical Zone.

Rio Comberciato, 1 female; rufous phase (egg in duct, Sept. 13) Santa Ana, 1 male, 1 female; reddish brown phase; 1 female nestling (July 16).

(708) CICCABA HUHULA (Daudin).

Strix huhula DAUDIN, Traité Élém. et Complet d'Orn., vol. 2, 1800, p. 190 (Cayenne).
Syrnium huhulum BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Santa Ana).

(716) SPEOTYTO CUNICULARIA JUNINENSIS Berlepsch and Stolzmann.

Speotyto cunicularia juninensis BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1902, vol. 2, p. 41 (Junin, Peru).
Pholeoptynx cunicularia SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).

This specimen is somewhat paler than any one of a series of six from Junin.

Pampa of Anta, near Huaracondo, 11,000 feet, 1 male.

(720) GLAUCIDIUM BRASILIANUM, subspecies.

Strix brasiliana GMELIN, Syst. Nat., vol. 1, 1788, p. 289 (Brazil).

An adult, in the gray phase of plumage, from the Temperate Zone.

Ollantaytambo, 1 male.

(724) TYTO PERLATA, subspecies.

Strix perlata SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 155 (Tinta).
Strix flammea perlata BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Santa Ana).

Order PSITTACIFORMES.

Family PSITTACIDAE.

MACAWS, PARROTS, PARRAKEETS.

(756) ARATINGA MITRATA MITRATA (Tschudi).

Conurus mitratus TSCHUDI, Wiegm. Arch. für Naturg., 1844, p. 304 (Peru); BERLEPSCH and STOLZMANN, Ornis, 1906, p. 99 (Idma).

All our specimens were taken in the Subtropical Zone between April 28 and July 20. We have also seven specimens taken in this zone in Bolivia (Province Cochabamba and Province Santa Cruz) between September 24 and November 6.

This species has been said to visit the Temperate Zone at certain seasons, attracted by crops of grain, but our specimens from Cuzco in the Temperate Zone, are clearly separable as a distinct though obviously representative form, the characters of which are discussed in connection with its description.

San Miguel Bridge (6,000 feet), 4 (June 29–July 20); Torontoy (8,000 feet), 5 (Apr. 28–July 20).

ARATINGA MITRATA ALTICOLA, new subspecies.

Subspecific characters.—Similar to *Aratinga mitrata mitrata* (Tschudi), but general color darker, less yellow, the under parts somewhat glaucous, the frontal band narrower, the cheeks with but few red feathers, the tibiae with no red.

Type.—No. 129,136, Amer. Mus. Nat. Hist., male adult, Cuzco, 11,000 feet, November 16, 1914; H. and C. Watkins.

Specimens examined.—*Aratinga mitrata alticola.* PERU: Type-locality, 1 male, 2 females. *Aratinga mitrata mitrata.* PERU: San Miguel Bridge, Urubamba Canyon, 6,000 feet, 1 male, 3 females; Torontoy, 7,800 feet, 4 males, 1 female. BOLIVIA: Tujima, 8,200 feet, Province of Cochabamba, 1 male, 1 female; Mizque, 7,500 feet, Province of Cochabamba, 1 male, 3 females; Rio Grande, 3,600 feet, Province of Santa Cruz, 1 (?).

Remarks.—The bird here described is evidently a zonal representative of *Aratinga mitrata mitrata* of which our 16 specimens are all from the Subtropical Zone, while *alticola* is a form of the Temperate Zone. Bolivian specimens of *mitrata* from the Subtropical Zone, when due allowance is made for seasonal variation, apparently agree with our Peruvian examples of this race from the same zone, showing that, in its zone, the species presents no racial variation in an area over 500 miles in length. When, however, in traveling but a few miles one passes from the Subtropical to the Temperate Zone, one goes also from the range of *mitrata* into that of *alticola.* Although so closely related to *mitrata* that its derivation from that form seems unquestionable, and although the ranges of the two forms merge into each other, our series of 19 specimens contains no examples which can not at once be referred to one form or the other. All the 16 specimens of *mitrata* have red on the tibiae, a variable number of red feathers scattered through the plumage, and only one is without red on the eye region. On the other hand, three specimens of *alticola* have no red on the tibiae, while the red in the body plumage is restricted to a narrow frontal band, the lores and a few feathers on the sides of the head. The differences in the tone of green mentioned in the diagnosis hold good throughout the series.

Lacking specimens of *A. frontatus,* I can make no comparison with that species in which the bend of the wing, tibiae, and crown, as well as forehead, are described as "scarlet."

(760) ARATINGA LEUCOPHTHALMA (Müller).

Psittacus leucophthalmus, P. L. S. Müller, Syst. Nat. Suppl., 1776, p. 75 (Guiana).

A male has more or less red on the cheeks and bend of the wing, and measures wing, 180, tail, 150.5, culmen 31 mm. We have no topotypical specimens. (On the variations of this species see Hellmayr, Nov. Zool., vol. 14, 1907, p. 85.)

Rio Cosireni, 1 male.

(803) AMOROPSITTACA ANDICOLA (Finsch).

Psittacula andicola Finsch, Proc. Zool. Soc., 1874, p. 90 (Paucartambo, Peru)

Bolborhynchus orbignesius Sclater and Salvin, Proc. Zool. Soc., 1869, p. 154 (Tinta).

Bolborhynchus andicola Berlepsch and Stolzmann, Ornis, 1906, p. 104 (Vilcabamba).

Ranges from the Subtropical to the Temperate Zone.

San Miguel Bridge, 2; Huaracondo Canyon, 2; Chospiyoc, 3; Calca, 1; Pisac, 1.

(834) AMAZONA FARINOSA INORNATA (Salvadori).

Chrysotis inornata Salvadori, Cat. Birds Brit. Mus., vol. 20, 1891, p. 281 (Veragua).

Agrees with a specimen from Gatun, Canal Zone. Ridgway (Bull. U. S. Nat. Mus. No. 50, pt. 7) states that this form intergrades with true *farinosa*.

Rio Comberciata, 1 female (Sept. 25, breeding).

(835) AMAZONA MERCENARIA (Tschudi).

Psittacus mercenaria Tschudi, Faun. Per., 1846, p. 270, pl. 27 (Peru).

Amazona mercenaria Berlepsch and Stolzmann, Ornis, 1906, p. 99 (Idma).

Order CORACIIFORMES.

Family ALCEDINIDAE.

KINGFISHERS.

(899) CHLOROCERYLE AMERICANA AMERICANA (Gmelin).

Alcedo americana Gmelin, Syst. Nat., vol. 1, 1788, p. 451 (Cayenne).

Ceryle americana Berlepsch and Stolzmann, Ornis, 1906, p. 96 (Santa Ana).

Family MOMOTIDAE.

MOTMOTS.

(917) MOMOTUS AEQUATORIALIS CHLOROLAEMUS Berlepsch and Stolzmann.

Momotus aequatorialis chlorolaemus Berlepsch and Stolzmann, Proc. Zool. Soc., 1902, vol. 2, p. 35 (Occobamba, Peru); Ornis, 1906, p. 96 (Idma).

Colombian specimens average browner both above and below, but several specimens in a series of 15 very nearly match the bird listed below.

Rio San Miguel, 4,500 feet, 1 female.

Family CAPRIMULGIDAE.

NIGHTJARS.

(938) UROPSALIS LYRA (Bonaparte).

Hydropsalis lyra BONAPARTE, Consp. Av., vol. 1, 1850, p. 59 (Colombia).
?*Macropsalis lyra peruana* BERLEPSCH and STOLZMANN, Ornis, 1906, p. 121 (Marcapata, Peru).

Our single specimen agrees in size and essentially in color, with a female from near Honda, Colombia. Berlepsch and Stolzmann appear to have based their proposed Peruvian race on comparison of but one specimen from Peru, with a male from Mérida, Venezuela. In view of this circumstance, it does not seem to be desirable to recognize at present a Peruvian form.

Torontoy, 1 female adult.

(943) HYDROPSALIS TORQUATA (Gmelin).

Caprimulgus torquatus GMELIN, Syst. Nat., vol. 1, 1789, p. 1032 (Brazil).
Hydropsalis torquata BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Idma).

Two specimens are somewhat darker than specimens from Matto Grosso, Santarem, and Bahia.

Rio Cosireni, 2 females (Aug. 27, eggs in ducts).

(948) NYCTIDROMUS ALBICOLLIS, subspecies.

Caprimulgus albicollis GMELIN, Syst. Nat., vol. 1, 1789, p. 1030 (Cayenne).

An adult male from the Tropical Zone agrees in general tone of color with a male from the Essequibo River (wing, 146; tail, 146 mm.), and is intermediate in size between that form and *derbyanus*. Additional material is required to determine the status of the south Peruvian bird.

Rio Cosireni, 1 male.

(955) THERMOCHALCIS RUFICERVIX (Sclater).

Stenopsis ruficervix SCLATER, Proc. Zool. Soc., 1866, p. 140, pl. 14 (Colombia).

A single immature specimen furnishes no basis for comparison of Peruvian with Colombian material.

Chospiyoc, 1 immature.

(964) ANTROSTOMUS NIGRESCENS Cabanis.

Antrostomus nigrescens CABANIS, Schomb. Reis. Guian., vol. 3, 1848, p. 710, (British Guiana).

This specimen is slightly larger than British Guiana birds and has the wings more spotted, characters of subspecific value if they are constant.

Rio Cosireni, 1 female.

Family MICROPODIDAE.

SWIFTS.

(968) STREPTOPROCNE ZONARIS ZONARIS (Shaw).

Hirundo zonaris SHAW, in Mill. Cim. Phys., 1796, p. 100, pl. 55 (no type locality, Chapada, Matto Grosso, Brazil, proposed as type locality; see Chapman, Bull. Amer. Mus. Nat. Hist., vol. 33, 1914, p. 604).
Chaetura zonaris BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Santa Ana).

Two specimens from the Tropical Zone agree in size with Matto Grosso specimens and in color and size with a specimen from near Rio. The latter was collected in 1916, while the Chapada birds, collected in 1883–1885, have evidently faded materially and are therefore browner in tone than freshly collected specimens.

Compared with the type of *altissima*, the two Peruvian birds have a narrower breast-band, less evident whitish margins on the bend of the wing, a darker forehead, and a bluer tone of color and are slightly smaller in size.

Lower Urubamba Canyon, altitude, 4,000 feet, 1 male, 1 female.

(983) CYPSELOIDES BRUNNEITORQUES BRUNNEITORQUES (Lafresnaye).

Chaetura brunneitorques LAFRESNAYE, Rev. Zool., 1844, p. 81 (Colombia).
Cypseloides brunneitorques BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Idma).

Our two specimens are from the Subtropical Zone. They agree with Colombian birds. The female has a broad rufous collar not so clear in color as in a Colombian male.

Torontoy, 1 male, 1 female.

(989a) MICROPUS PARVULUS Berlepsch and Stolzmann.

M. andecolus parvulus BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1892, p. 384, prov. descr. footnote (Ica, Peru).
Micropus peruvianus CHAPMAN, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 253, fig. 2. (Ollantaytambo, Peru.)

Specific characters.—Resembling *Micropus andecolus* (Lafresnaye and d'Orbigny), but tail shorter, less deeply forked, white areas of the plumage without buffy tints, forehead darker, basal under tail coverts with much less white. Tailed forked for 13.5 mm.

Common in the Temperate Zone and ranging downward to the upper limits of the Subtropical Zone. Doctor Hellmayr calls my attention to a provisional description of this form, as quoted above.

Ollantaytambo, 2; Huaracondo Canyon, 2; Torontoy, 2.

(991) MICROPUS MONTIVAGUS (d'Orbigny).

Cypselus montivagus d'ORBIGNY, Voy. Amer. Mer., 1835–1844, p. 357, pl. 42, fig. 1 (Samaypata, Bolivia).

Compared with a female from the Province of Santa Cruz, Bolivia, this Peruvian bird is blacker and has no white in the tail.

Torontoy, 1 female.

Family TROCHILIDAE.

HUMMINGBIRDS.

(1005) PHOETHORNIS GUY EMILIAE Bourcier and Mulsant.

Phoethornis emiliae BOURCIER and MULSANT, Ann. Sci. Phys. et Nat. Lyon, vol. 9, 1846, p. 317 (Bogotá).

Phaethornis guyi SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).

Agrees with Colombian specimens but has the white terminal part of the central rectrices narrower.

Rio San Miguel, 4,500 feet, 1 male.

(1057) EUPETOMENA MACROURA HIRUNDO Gould.

Eupetomena hirundo GOULD, Ann. Mag. Nat. Hist., vol. 16, 1875, p. 370 (Huiro, Santa Ana Valley, Peru), SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 18 (Huiro).

Eupetomena macroura hirundo BERLEPSCH and STOLZMANN, Ornis, 1906, p. 94 (Santa Ana).

Common at Santa Ana.

Santa Ana, 3 males, 1 female (July 10–16).

(1065) PATAGONA GIGAS (Vieillot).

Trochilus gigas VIEILLOT, Gal. Ois., vol. 1, 1825, p. 296, pl. 180 ("Bresil").

Patagona gigas SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 154 (Tinta).

A common species in the arid Temperate and Puna Zones. Our specimens were taken in the months of April, July, and November. A male collected in the last-named month is marked by Heller as "breeding."

La Raya, 1 male, 1 female; Pisac, 2 males, 4 females; Cuzco, 4 males, 2 females; Ttica-Ttica, 1 male, 1 female; Huaracondo Canyon, 1 male, 1 female; Chospiyoc, 3 males; Ollantaytambo, 3 males, 3 females.

(1066) LEUCIPPUS LEUCOGASTER (Tschudi).

Trochilus leucogaster TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 297 (Peru).

Leucippus chionogaster SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Huiro).

Santa Ana, 1 female (July 15).

(1068) LEUCIPPUS VIRIDICAUDA Berlepsch.

Leucippus viridicauda BERLEPSCH, Ibis, 1883, p. 493 (Huiro, Peru); Ornis, 1906, p. 96 (Idma).

Ranges from the Subtropical to the Temperate Zone.

Idma, 1 female, 1 ? (July 14); San Miguel Bridge, 3 males, 1 female (June 18-July 18); Ollantaytambo, 1 male, 1 female (Nov. 12; breeding).

(1150) CHLOROSTILBON PRASINUS DAPHNE Gould.

Chlorostilbon daphne GOULD, Introd. Troch., 1861, p. 177 (Pampas del Sacramento, Peru).

Chlorostilbon prasinus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Huiro).

Chlorostilbon prasinus daphne BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Santa Ana).

Santa Ana, 4 males, (July 15); San Miguel Bridge, 4 males (June 29–July 9).

(1189) COLIBRI CYANOTUS (Bourcier and Mulsant).

Trochilus cyanotus Bourcier and Mulsant, Ann. Soc. Agric. Lyon, vol. 6, 1844, p. 41 (Caracas).—Berlepsch and Stolzmann, Ornis, 1906, p. 95 (Idma).

(1190) COLIBRI IOLATA (Gould).

Petasophora iolata Gould, Proc. Zool. Soc., 1847, p. 9 (Bolivia).
Colibri iolatus Berlepsch and Stolzmann, Ornis, 1906, p. 95 (Idma).

This wide-ranging species is common in the Temperate Zone and two specimens were taken in the Subtropical Zone.

Idma, 1 male (Oct. 13); Torontoy, 1 male (Apr. 26); Ollantaytambo, 1 male, 2 females (July 5); Chospiyoc, 2 males (Apr. 21); Pisac, 5 males, 1 ? (Apr. 17–18); Ttica-Ttica, 3 males, 3 females (July 2–3).

(1212) OREOTROCHILUS ESTELLA (d'Orbigny and Lafresnaye).

Trochilus estella d'Orbigny and Lafresnaye, Mag. de Zool., 1838, p. 32 (Mojos, Bolivia).

Common in the Puna Zone.

Above Machu Picchu, 13,000 feet, 1 male (June 11); Ttica-Ttica, 5 males, 1 female (July 2).

(1228–1230) HELIODOXA LEADBEATERI Bourcier and Mulsant.

Heliodoxa leadbeateri Bourcier and Mulsant, Ann. Soc. Agric. Lyon, vol. 6, 1843, p. 43 (Caracas).

The females listed below and one from Locotal, Bolivia, are less solidly green below than some Colombian specimens and lack the bronze tint of others, but there is so much variation shown by Colombian specimens in this respect, that the differences mentioned cannot certainly be considered as racial. I am unable to separate males from Bolivia, Peru, Colombia and Merida, Venezuela.

Idma, 1 male, 2 females (July 14).

(1244) HELIANTHEA OSCULANS Gould.

Helianthea osculans Gould, Proc. Zool. Soc., 1871, p. 503 (Esachupata, Peru).

Torontoy, 2 males (May 6, July 21).

(1253) HELIANTHEA INCA (Gould).

Bourcieria inca Gould, Contr. Orn., 1852, p. 136 (Coroico, Bolivia).

We have no Bolivian specimens.

San Miguel Bridge, 1 ? (July 19); Torontoy, 3 males (July 20–21), 1 male (Nov. 2).

(1256) HELIANTHEA COELIGENA OBSCURA (Berlepsch and Stolzmann).

Lampropygia columbiana obscura Berlepsch and Stolzmann, Proc. Zool. Soc., 1902, vol. 2, p. 23 (Vitoc, Peru); Ornis, 1906, p. 95 (Idma).

Differs from an excellent topotypical series of *columbiana* as described by Berlepsch and Stolzmann.

Idma, 1 male, 1 female (July 14).

(1272) PTEROPHANES CYANOPTERUS (Fraser).

Trochilus cyanopterus FRASER, Proc. Zool. Soc., 1840, p. 17 ("Sta. Fé de Bogota").

P. temmincki BOISSONNEAU, *cf.* BANGS and PENARD, Bull. Mus. Comp. Zool., vol. 63, 1919, p. 24.

Apparently inseparable from Bogotá specimens.

Cedrobamba, 14,000 feet, 2 females (June 8).

(1277) AGLAEACTIS CASTELNAUDI (Bourcier and Mulsant).

Trochilus castelnaudi BOURCIER and MULSANT, Rev. Zool., 1848, p. 270 (Cuzco).

Above Ollantaytambo, 1 male (Nov. 7, breeding).

(1281) BOISSONNEAUA MATTHEWSI (Bourcier).

Trochilus matthewsi BOURCIER, Proc. Zool. Soc., 1847, p. 43 (Peru).

Panoplites matthewsi SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).

Boissonneaua matthewsi BERLEPSCH and STOLZMANN, Ornis, 1906, p. 95 (Idma).

Idma, 1 male, 1 female (July 12, 13); San Miguel Bridge, 3 males (June 18, 19); 1 female (July 8).

(1293) VESTIPEDES SAPPHIROPYGIA (Taczanowski).

Eriocnemis sapphiropygia TACZANOWSKI, Proc. Zool. Soc., 1874, p. 139 (Maraynioc, Peru).

I have seen no other specimens.

Above Machu Picchu, 13,000 feet, 1 male (May 21).

(1313) OCREATUS ANNAE (Berlepsch and Stolzmann).

Spathura annae BERLEPSCH and STOLZMANN, Ibis, 1894, p. 398 (Chanchamayo, Peru); Ornis, 1906, p. 95 (Idma).

? *Steganura addae* SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 95.

Idma, 2 males, 3 females (July 12–14); San Miguel Bridge, 1 female (July 20); Rio San Miguel, 1 female (Oct. 4).

(1321) ADELOMYIA MELANOGENYS CHLOROSPILA Gould.

Adelomyia chlorospila GOULD, Ann. Mag. Nat. Hist., 1872, p. 452 (San Antonio, "Peruvian Andes").

Adelomyia melanogenys BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Idma).

Compared with a series of *A. melanogenys maculata* from Ecuador, these birds have the tail tips equally broad, somewhat deeper in color and more rounded terminally, the bases of the rectrices with less or with no pale brownish.

Idma, 1 male (July 14); San Miguel Bridge, 1 female, 1 ? (July 19).

(1330) HELIANGELUS AMETHYSTICOLLIS (d'Orbigny and Lafresnaye).

Orthorhynchus amethysticollis d'ORBIGNY and LAFRESNAYE, Mag. de Zool., vol. 8, 1838, p. 31 (Yuracares, Bolivia).

We have no Bolivian specimens.

Torontoy, 8,000 feet, 1 male (Nov. 2); Cedrobamba, 12,000 feet 1 male (June 6).

(1346) METALLURA AENEOCAUDA (Gould).

Trochilus aeneocauda Gould, Proc. Zool. Soc., 1846, p. 87 (Bolivia).

Compared with Bolivian specimens, those from Peru have the throat yellower green, and the tail, seen from below, more coppery.

Cedrobamba, 2 males, 2 females (May 23–June 16).

(1350) METALLURA SMARAGDINICOLLIS SMARAGDINICOLLIS (d'Orbigny and Lafresnaye).

Orthorhynchus smaragdinicollis d'Orbigny and Lafresnaye, Mag. de Zool., vol. 8, 1838, p. 31 (Yungas, Bolivia).

Hartert [29] refers south Peruvian specimens to this form. I have no material for comparison.

Torontoy, 10,700 feet, 1 (May 10).

(1353) OREONYMPHA NOBILIS Gould.

Oreonympha nobilis Gould, Proc. Zool. Soc., 1869, p. 295 (Tinta, Peru).

Common in the arid Temperate and Puna Zones.

Ollantaytambo, 2 females (July 5, 12); Huaracondo Canyon, 2 males, 3 females (July 23); Chospiyoc, 1 male, 1 female (Apr. 18 and 20); Pisac, 4 females (Apr. 17–19); Cuzco, 1 male.

(1362) CHALCOSTIGMA STANLEYI VULCANI (Gould).

Ramphomicron vulcani Gould, Contrib. Orn., 1852, p. 135 (Bolivia).

An adult male differs from an Ecuadorian series of *stanleyi* in having the purple of the back reach to the forehead, the underparts sooty with purplish reflections, the throat-pendant glittering plumbeous rather than amethyst. It should apparently be referred to the Bolivian form of which, however, I have seen only an immature specimen.

Idma Road, 11,200 feet, 1 male (Oct. 9); Occobamba Valley, 9,100 feet, 1 female (Aug. 2).

(1363) CHALCOSTIGMA OLIVACEUM (Lawrence).

Ramphomicron olivaceus Lawrence, Ann. Lyc. New York, 1864, vol. 8, p. 44 (La Paz).

Agrees with a specimen from Maraynioc, but is considerably paler than an immature, poorly prepared specimen from La Paz, Bolivia.

Lucma-Cosireni Pass, 11,400 feet, 1 male (Oct. 7).

(1375) CYANOLESBIA MOCOA SMARAGDINA (Gould).

Trochilus smaragdinus Gould, Proc. Zool. Soc., 1846, p. 85 (Bolivia).

Our specimens agree with others from Bolivia.

Idma, 2 males (July 14).

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[29] Nov. Zool., 1899, p. 73.

(1391) PSALIDOPRYMNA NUNA (Lesson).

Ornismya nuna LESSON, Suppl. Ois. Mouches, 1831, p. 169, p. 35 (Peru).

Ollantaytambo, 3 males (Nov. 10–12, breeding), 1 ? (July 5); Chospiyoc, 2 males (Apr. 20); Calca, 3 females (Apr. 17–25); Pisac, 1 female (Apr. 20), Cuzco, 1 male.

(1418) CALLIPHLOX AMETHYSTINA (Gmelin).

Trochilus amethystina GMELIN, Syst. Nat., 1788, vol. 1, p. 496 (Cayenne).
Calliphlox amethystina BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Idma).

Agrees with a male from Merida, Venezuela. We have no Guiana specimens.

Rio Cosireni, 1 male.

(1420) CHAETOCERCUS MULSANTI (Bourcier).

Ornismya mulsanti BOURCIER, Ann. Sc. Phys. et Nat., Lyon, 1842, vol. 5, p. 344, pl. 20 (Colombia).
Acestrura mulsanti SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).

Order TROGONES.

Family TROGONIDAE.

TROGONS.

(1451) PHAROMACHRUS ANTISIENSIS (d'Orbigny).

Trogon antisiensis d'ORBIGNY, Mag. Zool., 1837, Class II, pl. 85 (Yungas, Bolivia).
Pharomacrus antisianus BERLEPSCH amd STOLZMANN, Ornis, 1906, p. 97 (Idma).

(1452) PHAROMACHRUS AURICEPS (Gould).

Trogon auriceps GOULD, Ann. Mag. Nat. Hist., 1842, vol. 9, p. 238 ("Quito").
Pharomacrus auriceps BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Idma).

An adult male with enlarged testes, taken July 19, agrees in size with specimens from western Ecuador. Comparison of adequate series from eastern and western Ecuador shows that the former average larger and slightly greener. The differences, however, do not appear to be constant enough to warrant the recognition of two races. Nor in any event could this be done satisfactorily without an examination of Gould's type, which, said to have come from "Quito," may have been collected on either the Amazonian or Pacific slope of the Andes. A male from Incachaca, Province of Cochabamba, shows that this Trogon ranges throughout the Subtropical Zone from Venezuela to Bolivia.

San Miguel Bridge, 1 male.

(1457) TROGONURUS PERSONATUS (Gould).

Trogon personatus GOULD, Ann. Mag. Nat. Hist., vol. 9, 1842, p. 237 (Andes of Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Idma).

(1458) TROGONURUS COLLARIS COLLARIS (Vieillot).

Trogon collaris Vieillot, Nouv. Dict. d'Hist. Nat., vol. 8, 1817, p. 330 (Cayenne).

Apparently to be referred to this form rather than to *virginalis* of western Ecuador. The male has the white tail-bands even broader than in one from eastern Ecuador, which in default of Cayenne specimen I accept as representing *collaris*, but the female is more dusky on the lores and auriculars than an east Ecuador bird, though not so much so as in the west Ecuador bird.

Rio Cosireni, 1 male, 1 female.

(1467) TROGONURUS BOLIVIANUS (Grant).

Trogon bolivianus Grant, Cat. Birds Brit. Mus., 1890, vol. 17, p. 470, pl. 15 (Cosnipata, Peru).

Our specimens confirm the validity of this species, and show that it ranges at least from the Beni River in Bolivia to the base of the eastern Andes in Colombia. Specimens from the Provinces of Cochabamba and Santa Cruz agree with a series from Chapada, Matto Grosso, and evidently represent *Trogonurus variegatus*. Hellmayr[30] recognizes the Bolivian form under the name *Trogon variegatus behni*, on the basis of larger size and shorter white tips to the outer rectrices, but in the absence of topotypical specimens of *variegatus* I am unable to say whether our Bolivian birds are separable. There can, however, be no doubt of their distinctness from *bolivianus*, which has broader black and narrower white bands on the tail; the throat, and breast largely or wholly purple, and with a narrower white band or none at all; and, as a rule, greener, less brassy back and bluer rectrices. These characters are most highly developed in our Colombian birds, but the Beni River specimen has less white in the tail than any other in the series.

Specimens examined.—Trogonurus bolivianus. Bolivia: Beni River, 1 male, 1 female. Peru: Rio Tavara (long. 70° 20′; lat. 13° 25′), 1 male; Rio Cosireni, 2 males (the type locality is about halfway between these two places). Ecuador: 1. Colombia: La Morelia, 1 male, 1 female, tail imperfect; Andes above La Morelia (2,500 feet), 1 male. *Trogonurus variegatus "behni."* Bolivia: Roquefalda, Province Cochabamba, 1 male; Rio Chimorié, Province of Cochabamba, 1 male; Todos Santos, Province of Cochabamba, 5 females; Vermejo, Province of Santa Cruz, 2 males. Brazil: Chapada, Matto Grosso, 8 males, 2 females.

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[30] Nov. Zool., 1908, vol. 15, p. 88.

Order COCCYGES.

Family CUCULIDAE.

CUCKOOS, ANIS.

(1488) PIAYA CAYANA OBSCURA Snethlage.

Piaya cayana obscura SNETHLAGE, Journ. für Ornith., 1908, p. 21 (Bom Lugar; Rio Verde, upper Purus, Brazil).

Piaya cayana boliviana STONE, Proc. Acad. Nat. Sci. Phila., 1908 (pub. Jan., 1909), p. 500 (Yungas, Bolivia).

Piaya cayana SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Huiro).

Piaya cayana nigricrissa BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Santa Ana).

I am unable to separate our specimens from six from Bolivia (Locotal, 3; Rio Chaparé, 3) and one from Tres Buritys River, Matto Grosso, Brazil. Hellmayr[31] refers specimens from Calama, Rio Madeira, to *obscura,* which apparently, therefore, is the name to be applied to birds from Bolivia and southern Peru.

Rio Cosireni, 1; San Miguel Bridge, 1; Uchumayo, Urubamba Canyon, 1; Rio San Miguel, 1.

(1496) TAPERA NAEVIA (Linnaeus).

Cuculus naevius LINNAEUS, Syst. Nat., vol. 1, 1766, p. 170 (Cayenne).

Diplopterus naevius SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 17 (Maranura).

Tapera naevius BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Santa Ana).

(1499) CROTOPHAGA ANI Linnaeus.

Crotophaga ani LINNAEUS, Syst. Nat., vol. 1, 1758, p. 105 (Brazil).—SCLATER and SALVIN, Proc. Zool Soc., 1876, p. 17 (Maranura; Potrero).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Santa Ana).

A wide ranging species of the Tropical Zone.

Santa Ana, 1; San Miguel Bridge, 3.

Order SCANSORES.

Family CAPITONIDAE.

BARBETS.

(1510a) CAPITO AURATUS INSPERATUS Cherrie.

Capito auratus insperatus CHERRIE, Bull. Amer. Mus. Nat. Hist., vol. 35, p. 391 (Todos Santos, Rio Chaparé, Bolivia).

Capito punctatus (not Lesson ?), subspecies, BERLEPSCH and STOLZMANN, Ornis, vol. 13, 1906, p. 123 (Rio Cadena, southeastern Peru).

Hellmayr[32] records specimens of *Capito* from the Province of Huánuco with which he writes birds from "Bogotá" agree. *Capito auratus auratus* (Dumont) thus inhabits the tropical zone at the eastern base of the Andes from Colombia to northern Peru. A female from the Rio Cosireni, however, has an unspotted throat and is clearly, therefore, not to be referred to true *auratus*. The identification of this specimen has necessitated a study of the specimens of the *auratus* group in our collections, including topotypes of *aurantiicinctus* Dalmas, and the type of *insperatus* Cherrie, to which, through the kindness of Mr. Bangs, has been added the type of *bolivianus* Ridgway, in which the following conclusions have been reached:

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[31] Nov. Zool., 1910, p. 401.

[32] Nov. Zool., vol. 14, 1907, p. 82.

CAPITO AURATUS AURATUS (Dumont).

The female is distinguished from other members of the group by its heavily spotted throat. In the male the crown averages darker than in other forms, ranging from brownish olive to Saccardo's olive tinged anteriorly with old gold. Colombian specimens can be matched in this respect by Orinoco birds (*aurantiicinctus*), but in the latter the crown averages paler, the yellow areas deeper, and the rump and abdomen are often marked with orange.

Specimens examined—COLOMBIA: Buena Vista, above Villavicencio, 4 males, 4 females; La Morelia, 1 female; "Bogota," 1 female ECUADOR: Napo, 1 female; Marañon, 1 male; "Ecuador," 1 male.

CAPITO AURATUS AURANTIICINCTUS Dalmas.

Capito aurantiicinctus DALMAS, Bull. Soc. Zool. France, 1900, p. 178 (Caura River, Ven.).

Capito auratus intermedius BERLEPSCH and HARTERT, Nov. Zool., vol. 9, 1902, p. 98 (Nericagua, upper Orinoco, Ven.).

Capito auratus bolivianus RIDGWAY, Proc. Biol. Soc. Wash., vol. 25, 1912, p. 87.

Further examination of our material from the Orinoco confirms my belief that there is but one form in this region. The orange abdominal band and orange marked rump, said to be characteristic of *aurantiicinctus*, is evidently not constant. In one of our males from La Union, on the lower Caura, this feature is pronounced, in the other it is wanting below and barely suggested above. In two males from the Cunucunuma River, the band below is well-marked, in three others it it less evident. Three of these birds have orange on the rump, in the fourth this character is lacking. In view of this variability in the character which is alleged to separate *intermedius* from *aurantiicinctus*, and the proximity of the Cunucunuma to the type locality of *intermedius*, I am convinced that the latter is not a valid race and I refer all our Orinoco specimens to *aurantiicinctus*.

Specimens examined.—La Union, Caura River, Venezuela, 2 males (topotypes); Boca de Sina, Cunucunuma River (near Mount Duida), Venezuela, 4 males, 2 females.

CAPITO AURATUS INSPERATUS Cherrie.

The crown in this race is paler than in any of the other forms, being in both sexes uniformly sulphine-yellow; a color not shown in the crown of other races; the nape is not materially darker than the forehead. Males do not exhibit the orange on the rump and abdomen, which is found in most, but not all, specimens of *aurantiicinctus*. Females of *insperatus* can be distinguished from our females of *aurantiicinctus* only by their much paler, uniformly colored crown.

Specimens examined.—BOLIVIA: Todos Santos, Province of Cochabamba, 4 males, including the type, 1 female; Mission San Antonio, Province of Cochabamba, 3 females; Rio San Antonio, 1 female; "Bolivia," 1 female. PERU: Rio Cosireni, 1 female; Astillero, Rio Tambopata, 1 male.

CAPITO AURATUS BOLIVIANUS Ridgway.

The type of this race, a male, is now before me. It was found by Dr. Thomas Barbour attached to an Indian necklace in a museum in La Paz, Bolivia, and was supposed to have come from the Rio Beni. It is the most richly colored bird in our series, but can be nearly matched by a male from the Cunucunuma River. The underparts of the type are deeper, and there is a trace of an orange abdominal band; the crown is antique brown with an old gold tint, slightly darker than that of the Cunucunuma bird. The yellow streaks on the back agree with those of the Cunucunuma bird, but there is no orange on the rump.

Our specimens seem to prove that *insperatus* ranges from southern Peru to Bolivia, east of the Beni and indicate that the locality attributed to the type of *bolivianus* is incorrect. Indeed, without a more definite data in regard to the Indian necklace to which as an ornament it was attached, one can not say where this type came from, but regardless of locality it is clearly more closely related to the Orinoco bird than to any other known form of this interesting group.

(1517) CAPITO VERSICOLOR (P. L. S. Müller).

Bucco versicolor P. L. S. MÜLLER, Syst. Nat. Suppl., 1776, p. 88 ("Maynas").
Capito versicolor BERLEPSCH and STOLZMANN, Ornis, 1906, p. 98 (Idma).

Common in the Subtropical Zone at Idma. One male has the malar stripe largely yellow, in two others it is tinged with yellow, thus showing the approach to *C. glaucogularis* which was commented on at length by Berlepsch and Stolzmann in recording a specimen from Idma.[33] The malar stripe averages broader than in specimens from Bolivia.

Idma, 6 males, 3 females.

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[33] Ornis, 1906, p. 98.

Family RAMPHASTIDAE.

TOUCANS.

(1547) PTEROGLOSSUS CASTANOTIS CASTANOTIS Gould.

Pteroglossus castanotis GOULD, Proc. Zool. Soc., 1833, p. 119 (Brazil).

The form found at the base of the Andes from Colombia to Bolivia is apparently to be referred to this race.

Rio Cosireni, 1 male, 2 females.

(1566) SELENIDERA LANGSDORFFI (Wagler).

Pteroglossus langsdorffi WAGLER, Syst. Av., 1827, p. 12 (Brazil).

Rio Comberciato, 1 female.

(1578) AULACORHYNCHUS CAERULEOCINCTUS d'Orbigny.

Aulacorhynchus caeruleocinctus d'ORBIGNY, Voy. Amer. Mér., 1834–47, p. 382, pl. 66, fig. 2 (Bolivia).

Inhabits the Subtropical Zone. Agreeing with Bolivian specimens.

San Miguel Bridge, 2.

Order PICIFORMES.

Family BUCCONIDAE.

BUCCOS, PUFFBIRDS.

(1627) BUCCO CHACURU Vieillot.

Bucco chacuru VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 3, 1816, p. 239 (Paraguay).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Santa Ana.)

(1628) NYSTALUS STRIOLATUS (Pelzeln).

Bucco striolatus PELZELN, Sitz. Akad. Wien, vol. 20, 1856, p. 509 (Engenho do Cap Gama).

No specimens available for comparison.

Rio Comberciato, 1 female (oviduct contained egg with hard white shell, Sept. 25).

(1638) MALACOPTILA FULVIGULARIS FULVIGULARIS Sclater.

Malacoptila fulvigularis SCLATER, Proc. Zool. Soc., 1853, p. 123 (Bolivia).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 97 (Idma).

A female differs from Bolivian examples much as *M. f. melanopogon* Berlepsch and Stolzmann, of Garita del Sol, is said to. Nevertheless these authors state that three specimens from Idma are nearer to the Bolivian than to the central Peruvian form.

Near Machu Picchu, 1 female.

(1653) MONASA MORPHOEUS PERUANA Sclater.

Monasa peruana SCLATER, Proc. Zool. Soc., 1855, p. 194 (Chamicuros, Peru).

Differs from a Bahia specimen only in the smaller amount of white about the base of the bill.[34]

Rio Cosireni, 1 female.

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[34] See also Hellmayr, Nov. Zool., vol. 12, p. 297.

Family PICIDAE.

WOODPECKERS, PICULETS.

(1662) COLAPTES PUNA Cabanis.

Colaptes puna CABANIS, Journ. für Ornith., 1883, p. 98 (Valle de Tauli, W. Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 104 (Vilcabamba).

Colaptes rupicola SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 154 (Tungasuca; Tinta).

Specimens from Guaqui, at the southern end of Lake Titicaca are referable to *C. rupicola*, while a series from Tirapata all have the red nape of *C. puna*. These specimens indicate, therefore, the non-integradation of these representative species. I have no examples of *cinereicapillus*. Specimens from Junin are referable to *puna*.

Ollantaytambo (12–13,000 feet), 1 male (breeding, Nov. 7), 1 female; Chospiyoc, 1 juv.; La Raya, 4 males, 1 female, 1 ?

(1682) CHLORONERPES CHRYSOGASTER Berlepsch and Stolzmann.

Chloronerpes chrysogaster BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1902, vol. 2, p. 32 (Garita del Sol, central Peru).

A specimen from Santo Domingo, in southeastern Peru, suggests the probability of the intergradation of this form with *C. r. canipileus* of Bolivia. It is near the latter but in its deeper yellow color and less distinct bars of the abdomen it approaches *chrysogaster*. As Berlepsch and Stolzmann have already said, it is a singular fact that birds from Colombia, Venezuela, and Bolivia should more nearly resemble each other than do those from Bolivia and Peru. Other than a small difference in size, the Bolivian bird being larger with a longer bill, I am indeed unable to separate *C. r. meridensis* from *C. r. canipileus*.

Lucma, 1 female (breeding, Aug. 18); San Miguel Bridge, 1 male.

(1733) VENILIORNIS HAEMATOSTIGMA HILARIS (Cabanis and Heine).

Campias hilaris CABANIS and HEINE, Mus. Hein., vol. 4, pt. 2, 1863, p. 154 (Peru).

Veniliornis haematostigma hilaris BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Santa Ana).

As Berlepsch has shown,[35] Malherbe founded his *Mesopicus haematostigma* on Natterer's birds from Borba and Maribataños in Brazil to which, therefore, the name should be restricted, while *hilaris*, as above, is applicable to the Peruvian form. I have no Brazilian specimens, but these two birds from Peru differ from two specimens from the Province of Santa Cruz, Bolivia (which should more nearly resemble true *haematostigma*) in being more broadly barred with white below, the olive bars, therefore, being not only broader but darker, and they are more deeply colored above. I consequently follow Berlepsch in accepting *hilaris* as the name of the Peruvian form.

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[35] Proc. Zool. Soc., 1902, p. 34.

In the light of this material two specimens from La Morelia, in eastern Colombia[36] may perhaps better be referred to *V. h. orenocensis* Berlepsch and Hartert which, on the basis of two specimens from the upper Orinoco, appears to be merely a small form of *hilaris*. Two adult males from Peru and Bolivia, both lack the "fulvous yellow" on the neck, whitish line under the eye and whitish anteocular spot, the absence of which is said to distinguish the Orinoco form. Unfortunately no specimens of *ruficeps* are available.

Rio Cosireni, 1 male; near Santa Ana, 1 female.

(1752) CELEUS GRAMMICUS (Malherbe).

Picus grammicus MALHERBE, Mém. Soc. Roy. Liége, vol. 2, 1845, p. 69.

An adult male is referred to this species of which I have seen no authentic specimens. It is considerably darker than Malherbe's plate.

Rio Comberciato, male.

(1762) CAMPEPHILUS MELANOLEUCUS MELANOLEUCUS (Gmelin).

Picus melanoleucus GMELIN, Syst. Nat., vol. 1, 1788, p. 462 (Surinam).

Rio Cosireni, 1 male.

(1767) CNIPARCHUS HAEMATOGASTER HAEMATOGASTER (Tschudi).

Picus haematogaster TSCHUDI, Arch. für Naturg., 1844, p. 302, pl. 25 (Peru).
Campephilus haematogaster BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Idma).

(1770) CEOPHLOEUS LINEATUS LINEATUS (Linnaeus).

Picus lineatus LINNAEUS, Syst. Nat., vol. 1, 1766, p. 174 (Cayenne).
Ceophloeus lineatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 96 (Santa Ana).

(1788) PICUMNUS JELSKII Taczanowski.

Picumnus jelskii TACZANOWSKI, Proc. Zool. Soc., 1882, p. 41, pl. 2, fig. 3 (Paltay pampa, Cen. Peru).

I have no material for comparison.

San Miguel Bridge, 3 males, 2 females.

Order PASSERIFORMES.

Family HYLACTIDAE.

TAPACOLAS, ETC.

(1818) SCYTALOPUS ACUTIROSTRIS Tschudi.

Scytalopus acutirostris TSCHUDI, Arch. für Naturg., 1844, p. 282 (Peru).

While certain species of the genus *Scytalopus* differ from each other but slightly, they have, nevertheless, most extended ranges. *S. niger*, for example, ranges from Chile to Colombia (though there must be many breaks in its distribution); *S. micropterus*, with but slight change, from Bolivia to Colombia. Specimens for comparison have not always been available, and the same species has therefore received different names in various parts of its range. Misidentifications have been frequent, and no one appears to have had the material for a revision of the group. As a result, existing descriptions are contradictory, and in short the group is badly in need of revision. Some years ago, having access to the Lafresnaye types and possessing a large number of Colombian specimens, I attempted to treat[37] (of the northern members of the genus, but lack of authentic Peruvian specimens prevented the satisfactory identification of all my material and with specimens from Peru now before me this want is felt even more strongly. Examination of the descriptions of von Tschudi, Taczanowski, von Berlepsch, and others reveals confusing contradictions, and I find myself quite unable to reach satisfactory conclusions regarding the identity of two of our three species of this genus. The two birds here referred to *S. acutirostris*, do not agree with von Tschudi's description of that species, but do agree with a description by Taczanowski of a "Oiseau typique de Tschudi."[38] They are dark slate color, with the posterior parts of the body cinnamon-brown barred both above and below with blackish; the tail, which appears to afford one of the most diagnostic characters in the birds of this genus, is slate-gray in the male and tinged with brownish in the female, but *without bars* in either. The birds measure: Male, wing, 60; tail, 44; tarsus, 23.5; culmen, 12 mm. Female, wing, 58; tail, 39; tarsus, 24; culmen, 11.

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[36] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 353.

Occobamba Valley (9,100 feet), 1 male, 1 female.

SCYTALOPUS, species.

Two specimens from Cedrobamba, in the humid Temperate Zone, and one from Limbani, in southeastern Peru, agree in general color and pattern with the birds above recorded, but are paler with a silvery sheen on the plumage of the anterior parts of the body, a faint suggestion of a gray postocular stripe, a brownish tail with the central feathers *indistinctly barred with black*. Were it not for the latter character, they might be referable to *S. simonsi*, which is described as similar to *S. silvestris* but lacking the white patch on the abdomen, and having a whitish eyebrow. Taczanowski, however, describes the adult of *sylvestris* (and my specimens are adult) as having the tail "brune noiratre." My specimens measure:

Place.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
Cedrobamba	Male	48	....	19.5	11
Do	Female	53	34	22	11
Limbani	...do...	48	31	20.5	10.5

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[37] The Auk, vol. 32, 1915, pp. 406–423.

[38] Orn. du Perou, vol. 1, p. 533.

(1825) SCYTALOPUS MICROPTERUS BOLIVIANUS Allen.

Scytalopus bolivianus ALLEN, Bull. Amer. Mus. Nat. Hist., vol. 2, 1889, p. 98 (Reyes, Bolivia).

Comparison of the type of this form with a large series from Colombia shows that it differs only in being smaller. The type is not sexed, but is apparently a male, being dark slate with a silvery white crown-patch, only the posterior parts of the body being brown. It measures: Wing, 50; tail, 34; tarsus, 22; culmen, 12 mm. An average Colombian male measures: Wing, 61; tail, 43; tarsus, 24; culmen, 13.5.

Idma, female juv.

Family FORMICARIIDAE.

ANT BIRDS.

(1876) THAMNOPHILUS MELANOCHROUS Sclater and Salvin.

Thamnophilus melanochrous SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 18, pl. 3 (Huiro, Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 93 (Idma).

With the exception of one from Santa Ana, our specimens are from the Subtropical Zone. They are all essentially topotypical.

Santa Ana, 1 female; Idma, 4 males, 4 females; San Miguel Bridge, 6 males, 7 females; Torontoy, 3 males, 2 females.

(1912) THAMNOPHILUS RADIATUS SUBRADIATUS Berlepsch.

Thamnophilus subradiatus BERLEPSCH, Journ. für Ornith., 1887, p. 17 (Upper Amazonia).

Thamnophilus radiatus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro; Maranura).

Thamnophilus nigricristatus subradiatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 93 (Santa Ana).

I follow Berlepsch in referring Santa Ana specimens to this form and Ridgway in ranking *subradiatus* as a race of *radiatus*.

Santa Ana, 2 males, 1 female; Chauillay, 1 female; San Miguel Bridge, 1 male.

(1936) DYSITHAMNUS OLIVACEUS (Tschudi).

Thamnophilus olivaceus TSCHUDI, Faun. Per., 1844, p. 174, pl. 11, fig. 1 (Central Peru).

Dysithamnus olivaceus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 93 (Santa Ana; Idma).

(1999) HERPSILOCHMUS MOTACILLOIDES Taczanowski.

Herpsilochmus motacilloides TACZANOWSKI, Proc. Zool. Soc., 1874, p. 136 (Maraynioc).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 94 (Idma).

Three specimens, collected and sexed by the writer, confirm Berlepsch's statement that Taczanowski described as a male either a young male or female. The sexual differences are clearly given by Berlepsch.[39] I have seen no other specimens.

Idma, 1 male, 2 females.

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[39] Proc. Zool. Soc., 1896, p. 381.

(2016a) MICRORHOPIAS RUFA RUFATER (Lafresnaye and d'Orbigny).

Thamnophilus rufater LAFRESNAYE and d'ORBIGNY, Syn. Av., 1837, vol. 1, p. 12 (Chiquitoseni, Bolivia).

Formicivora rufatra SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Formicivora rufa rufatra BERLEPSCH and STOLZMANN, Ornis, 1906, p. 94 (Santa Ana).

The males are less rufous above but of practically the same size as one from São Paulo.

Santa Ana, 1 male, 1 female; Chauillay Bridge, 1 male, 1 female.

(2028a) MICRORHOPIAS BICOLOR, subspecies.

An adult male is intermediate between *quixensis* and *bicolor* but is larger and with a much heavier bill than either. It doubtless represents an undescribed race.

Rio Comberciato, 1 male.

(2055) CERCOMACRA TYRANNINA APPROXIMANS Pelzeln.

Cercomacra approximans PELZELN, Orn. Bras., 1868, pp. 85, 158 (Engenho do Cap Gama).

Two immature specimens are provisionally referred to this form of which I have seen no authentic specimens.

Rio San Miguel (4,500 feet), 1.

(2179) GRALLARIA SORORIA Berlepsch and Stolzmann.

Grallaria sororia BERLEPSCH and STOLZMANN, Ornis, 1901, p. 194 (Idma, Peru); 1906, p. 94 (Idma).

(2192) GRALLARIA ERYTHROLEUCA Sclater.

Grallaria erythroleuca SCLATER, Proc. Zool. Soc., 1873, p. 783 (Huasampilla, Peru).

These specimens are from near the type locality.

Occobamba Valley (9,100 feet), 3.

(2198) OROPEZUS RUFULA OBSCURA (Berlepsch and Stolzmann).

Grallaria rufula obscura BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 385 (Maraynioc).

Traps which Heller set for small mammals proved effective in securing an excellent series of this form in the humid Temperate Zone. Berlepsch and Stolzmann based their description on a single specimen which was compared with an evidently inadequate series of true *rufula*. The latter race, as stated in my paper on Colombian Birds,[40] shows much variation, having what might be termed fulvous and rufous phases. The latter is the rarer and is shown by only 2 of our 19 specimens from Colombia and Ecuador. Both are from near Bogotá where, however, the rufous phase is also represented. It was evidently with the fulvous phase that the comparison of *obscura* was made, since all our Peruvian specimens are much paler than rufous specimens of *rufula,* in fact are intermediate in color between the two phases. They are more uniform in color than a series of 8 specimens from Ecuador, which in turn show less variation than our series of 11 specimens from Colombia. The latter includes examples from each of the three Andean ranges in that country, and it is possible that the variations which they exhibit may in part be racial, though before learning of the constancy shown by these Peruvian birds I had considered the variations shown in Colombian specimens to be wholly individual.

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[40] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 397.

Above Machu Picchu (12,000 feet), 4; Occobamba Valley (9,100 feet), 4.

Family DENDROCOLAPTIDAE.

WOODHEWERS, OVENBIRDS.

(2230) GEOSITTA TENUIROSTRIS (d'Orbigny and Lafresnaye).

Certhilauda tenuirostris d'ORBIGNY and LAFRESNAYE, Syn. Av., vol. 1, 1837, p. 72 (Cochabamba, Bolivia).

Geositta tenuirostris SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 153 (Tinta; Tungasuca).

I have no topotypical specimens, but the specimens listed below, together with 8 from Tirapata and 2 from Puno, agree with 3 from northwestern Argentina (Tilcara and above Tafi del Valle).

La Raya, 3; Cuzco, 2; Occombamba Pass, 2; Huaracondo Canyon, 1.

(2252) UPUCERTHIA PALLIDA Taczanowski.

Upucerthia pallida TACZANOWSKI, Proc. Zool. Soc., 1883, p. 71 (Junin, Peru).

A common species at Tirapata and La Raya. The only topotypical specimen which I have seen is in much worn plumage. It is darker above, and the rufous of the wings and tail is less bright than in the following specimens:

Ttica-Ttica, 1; La Raya, 1 male; 1 female; 1 ?.

(2268) CINCLODES FUSCUS RIVULARIS (Cabanis).

Cillurus rivularis CABANIS, Journ. für Ornith., 1873, p. 319 (Maraynioc, Peru).

Cinclodes fuscus SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 153 (Tungasuca).

Our specimens agree with one from Lake Junin which may be considered topotypical.

Idma Pampa (11,200 feet), 1 (Oct. 9, "breeding"); above Machu Picchu (12,000–14,000 feet), 2; Ollantaytambo, 1; Huaracondo Canyon, 2; Ttica-Ttica, 5; Cuzco, 1; La Raya, 6.

(2273) CINCLODES ATACAMENSIS (Philippi).

Upucerthia atacamensis PHILIPPI, Arch. für Naturg., 1857, p. 263 (San Pedro de Atacama, Chile).

I have no topotypical material.

La Raya, 4; Pisac, 1; Calca, 1; Chospiyoc, 1.

(2280) LOCHMIAS OBSCURATA Cabanis.

Lochmias obscurata CABANIS, Journ. für Ornith., 1873, p. 65 (Monterico, Peru).
Lochmias sororia BERLEPSCH and STOLZMANN, Ornis, 1906, p. 91 (Santa Ana).

It is probable that the specimen recorded by Berlepsch and Stolzmann came from the Subtropical Zone above Santa Ana.

(2287) SCHIZOEACA PALPEBRALIS Cabanis.

Schizoeaca palpebralis CABANIS, Journ. für Ornith., 1873, **p.** 319 (Maraynioc, Peru).

I have seen no topotypical specimens of this representative of *S. griseo-murina.*

(Cedrobamba, 12,000 feet), 3; above Torontoy, 14,000 feet, 3.

(2295a) LEPTASTHENURA ANDICOLA PERUVIANA Chapman.

Leptasthenura andiçola peruviana CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 327 (La Raya, Peru).

Subspecific characters.—Similar to *Leptasthenura andicola andicola* of Ecuador, but crown light cinnamon-rufous instead of dark hazel, the black margins much narrower, the malar region and throat whiter, the lores and auriculars more rufescent, the back more broadly streaked with white, the wing-coverts and tertials narrowly but distinctly margined with pale cinnamon-rufous, markings near and at the base of the inner wing quills pale cinnanon-rufous and more evident, tail longer. Wing, 74; tail, 95; culmen, 11 mm.

La Raya, 1.

(2297) LEPTASTHENURA PILEATA Sclater.

Leptasthenura pileata SCLATER, Proc. Zool. Soc., 1881, p. 487 ("Lima"-Andes above Lima).

A specimen from timber line (14,000 feet) above Torontoy does not agree with Sclater's description, and Mr. Chubb, to whom I have submitted a photograph of our bird, writes that it differs from the type and other specimens in the British Museum in having the black and white pattern of the throat "coarser and more contrasting." Sclater's description reads "beneath cinereous, with white shaft-stripes more distinct on the throat and breast," while our bird has no shaft-stripes below and the strongly marked black and white throat and upper breast are sharply defined from the rest of the underparts. It doubtless represents a new form, but I hesitate to describe it without actual comparison with *pileata.*

Above Torontoy, 14,000 feet, 1 male.

(2307) SYNALLAXIS AZARAE AZARAE d'Orbigny.

Synallaxis azarae d'ORBIGNY, Voy. Amer. Mér., Ois., 1839–1847, p. 246 (Vallegrande, Bolivia).
Synallaxis griseiventris BERLEPSCH and STOLZMANN, Ornis, 1906, p. 91 (Idma).

Inhabits the Subtropical Zone. Our specimens agree with the type of *Synallaxis griseiventris* Allen,[41] but the crown averages deeper in color.

Idma, 3; San Miguel Bridge, 8; Torontoy, 6.

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[41] Said by Hellmayr to be synonymous with *azarae.* see Berlepsch, Proc. IV Int. Orn. Cong., 1907, p. 363.

(2318) SYNALLAXIS HYPOSPODIA Sclater?

Synallaxis hypospodia SCLATER, Proc. Zool. Soc., 1874, p. 10 (Bahia).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 92 (Santa Ana).

A single specimen agrees with one from Bahia, but the identification must be considered as provisional.[42]

Santa Ana, 1.

(2373) SIPTORNIS ALBICAPILLA (Cabanis).[43]

Synallaxis albicapilla CABANIS, Journ. für Ornith., 1873, p. 319 (Maraynioc, Peru).

A male agrees with Cabanis's description.

Cedrobamba, 1 male.

(2378a) SIPTORNIS MODESTA PROXIMA, new subspecies.

Subspecific characters.—Similar to *Siptornis modesta sajamae* Berlepsch, but upper parts darker, Saccardo's umber rather than buffy brown; band in wing darker; hazel instead of cinnamon-rufous; tail shorter.

Type.—Cat. No. 145,191, Amer. Mus. Nat. Hist., female adult, Ttica-Ttica, 11,500 feet, near Cuzco, Peru, July 2, 1916; F. M. Chapman.

Specimens examined.—*Siptornis modesta proxima.* PERU: Type-locality, 1 female (July 2); La Raya, 14,000 feet, 3 males, 1 female (April 5); Junin, 12,900 feet, 1 male (April 3). *Siptornis modesta sajamae.* PERU: Puno, 12,600 feet, 1 male, 1 female (Aug. 6, 2); Tirapata, 12,700 feet, 5 males, 8 females 1 ? (July 28–Aug. 3).

Remarks.—It is difficult to understand how so common, easily observed, and widely distributed a species as *Siptornis modesta* appears to be, at least in southern Peru, can have escaped previous observers. Possibly it has been recorded under some other name, but, if so, I have failed to find one that is applicable to it. It belongs in that section of the group having the rump and upper tail coverts uniform with the unstreaked back and all the retrices, including the outer pair, bicolored, and this excludes the possibility of its being referable to *S. pudibunda*, as that species is commonly described.

Mr. Charles Chubb has been kind enough to confirm my identification of Tirapata specimens as *Siptornis modesta.* They agree in color with examples from Puno which are doubtless referable to *Siptornis modesta sajamae* Berlepsch, of western Bolivia, but are nearer the form here described in size. Specimens from just beyond the divide at La Raya, might be expected to resemble those of Tirapata, distant only some 60 miles, and where apparently similar environmental conditions prevail; but, on the contrary, they agree with the type and, what is more surprising, with an example from Junin, distant 450 miles. The differences between the two forms are slight, but their apparent significance and obvious bearing on the origin of the life of the Titicacan Basin impels their recognition by name.

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[42] See Hellmayr, Nov. Zool., 1914, p. 364.

[43] Consult a recent revision of the genus "*Siptornis*," by Cory, Proc. Biol. Soc. Wash., vol. 32, 1919, pp. 149–160.

Measurements.

Place.	Sex.	Wing.	Tail.
Bolivia (ex Berlepsch)[1]	Male	69–70	75–76
Puno, Titicaca [1]	do	71	76
La Raya [2]	do	69	66
Junin [2]	do	68	65
Bolivia (ex Berlepsch)[1]	Female	67–68	71–73
Puno, Titicaca [1]	do	67	68
Ttica-Ttica [2]	do	61	60
La Raya [2]	do	64	60

[1] *Siptornis modesta sajamae.*

[2] *Siptornis modesta proxima.*

(2385) SIPTORNIS OTTONIS Berlepsch.

Siptornis ottonis Berlepsch, Proc. Third Int. Cong., 1901, p. 197 (Cuzco, Peru).

Huaracondo Canyon, 1; Cuzco, 1.

(2397) SIPTORNIS GRAMINICOLA (Sclater).

Synallaxis graminicola Sclater, Proc. Zool. Soc., 1874, p. 446, pl. 58, fig. 2 (Junin, Peru).

More richly colored below than a specimen in worn plumage from Oroya.

Ttica-Ttica, 2.

(2401a) SIPTORNIS URUBAMBENSIS Chapman.

Siptornis urubambensis Chapman, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 328 (above Machu Picchu (14,000 feet), Peru).

Specific characters.—Size of *Siptornis flammulata* to which it bears a general resemblance in the color of the underparts, but upperparts Prout's brown, the streaks obscure ochraceous-buff and extending little, if any, posterior to the nape; tail uniform, of about the same color as the back, without rufous.

Inhabits the Temperate Zone.

Above Machu Picchu, 14,000 feet, 2; 12,000 feet, 3.

(2409) PSEUDOCOLAPTES BOISSONNEAUTI AURITUS (Tschudi).

Anabates auritus Tschudi, Arch. für Naturg., 1844, p. 294 (Peru).

Distinguished from Colombian and Ecuadorian examples chiefly by its yellow-tinged throat and cheek-tufts. Inhabits the Subtropical Zone.

Torontoy, 3.

(2420a) PHACELLODOMUS STRIATICEPS GRISEIPECTUS Chapman.

Phacellodomus striaticeps griseipectus CHAPMAN, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 258 (Ttica-Ttica, near Cuzco, Peru).

Subspecific characters.—Throat and breast grayish vinaceous-buff, instead of being essentially pure white; flanks and abdominal region much deeper, the former nearly ochraceous-tawny; ear coverts and sides of the neck grayer, less cinnamon-rufous; upper parts averaging darker, with less cinnamon-rufous, especially anteriorly.

Ttica-Ttica, 5; Calca, 2; Cuzco, 5; Anta, 1; La Raya, 1; Huaracondo Canyon, 1.

(2478) THRIPADECTES SCRUTATOR Taczanowski.

Thripadectes scrutator TACZANOWSKI, Proc. Zool. Soc., 1874, p. 137 (Maraynioc, Peru).

I have no material for comparison.

Lucma (8,000 feet), 1.

(2493) XENOPS RUTILUS HETERURUS Cabanis and Heine.

Xenops heterurus CABANIS and HEINE, Mus. Hein., vol. 2, 1859, p. 33 (Colombia).
Xenops rutilus heterurus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 92 (Idma).

These specimens are slightly smaller than Colombian examples, but essentially agree with them in color. Found in the Subtropical Zone.

Idma, 2; San Miguel Bridge, 3; Rio San Miguel, 1.

(2508) MARGARORNIS PERLATA (Lesson).

Sittasomus perlatus LESSON, Echo du Monde Sav., Aug. 11, 1844, col. 275 (Bogotá-El Piñon, above Fusugasugá, altitude 9,600 feet).
? *Margarornis perlata peruviana* CORY, Field Mus. Pub., No. 167, 1913, p. 291 (Tambo Ventija, 10 miles east of Molinopampa, Peru).

Found in the Temperate Zone. These specimens have the throat and spots of the under surface more yellow than in most specimens of true *perlata*, but they can be matched by at least half a dozen specimens in a series of *perlata* from Colombia. I find no difference in the coloration of the upper parts of adults from the two countries.

Cedrobamba (12,000 feet), 3; above Torontoy (14,000 feet), 2.

(2511) PREMNORNIS GUTTATA (Lawrence).

Margarornis guttata LAWRENCE, Ann. Lyc. New York, vol. 8, 1867, p. 128 (Quito).

This specimen can be matched by one from near Bogotá, which I have referred to *guttata* on the basis of the agreement of an immature Colombian specimen, from San Antonio, with Lawrence's type, which is also immature.

Idma, 1.

(2589) THRIPOBROTUS WARSCEWICZI WARSCEWICZI Cabanis and Heine.

Thripobrotus warscewiczi CABANIS and HEINE, Mus. Hein., vol. 2, 1859, p. 39 (Peru).

Picolaptes lacrymiger warszewiczi BERLEPSCH and STOLZMANN, Ornis, 1906, p. 92 (Idma).

On comparison of this specimen with one from Molinopampa, northern Peru, Mr. C. B. Cory writes that he considers it "to be nearly or quite typical of *warscewiczi*."

San Miguel Bridge, 1.

(2596) THRIPOBROTUS FUSCICAPILLUS Pelzeln.

Picolaptes fuscicapillus PELZELN, Orn. Bras., vol. 1, 1868, p. 63 (Engheno do Gama, Matto Grosso, Brazil).

After comparing specimens from southeastern Peru with the type of *fuscicapillus*, Hellmayr[44] refers them to that species. Three specimens, one each from Todos Santos, Province Cochabamba, Bolivia, Astillero, southeastern Peru, and Rio Cosireni, agree, and, in view of Hellmayr's conclusions, are doubtless inseparable from *fuscicapillus*. This species has also been recorded from the Chanchamayo district by Berlepsch and Stolzmann,[45] and from Sarayacu, Ecuador by Sclater,[46] but the last-named specimen requires redetermination.

Rio Cosireni, 1.

Family TYRANNIDAE.

TYRANT FLYCATCHERS.

(2631) AGRIORNIS POLLENS Sclater.

Agriornis pollens SCLATER, Proc. Zool. Soc., 1869, p. 153 (Panza, Ecuador).

These specimens are somewhat smaller than two from Ecuador, and have the throat less heavily streaked. Neither of two males has the outer primary acuminate.

La Raya, 6.

(2633) AGRIORNIS SOLITARIA INSOLENS Sclater and Salvin.

Agriornis insolens SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 153 (Tinta, Peru).

Above Ollantaytambo (13,000 feet), 1; Ttica-Ttica, 2; La Raya, 4.

(2636) CNEMARCHUS ERYTHROPYGIUS (Sclater).

Taenioptera erythropygia SCLATER, Proc. Zool. Soc., 1851, p. 193, pl. 41 (Ecuador).

The breast and head are grayer than in two old Ecuador specimens.

Cedrobamba (12,000 feet), 2.

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[44] Verh. Orn. Gesell. Bayern, vol. 11, 1912, p. 161.

[45] Proc. Zool. Soc., 1896, p. 378.

[46] Cat. Birds. Brit. Mus., vol. 15, 1890, p. 154.

(2653a) OCHTHOECA FUMICOLOR BERLEPSCHI Hellmayr.

Ochthoeca fumicolor berlepschi HELLMAYR, Nov. Zool., vol. 21, 1914, p. 167 (Malaga, w. Bolivia).
Ochthoeca oenanthoides AUTHORS.

Our specimens essentially agree with one from Limbani, southeastern Peru, and differ from *O. f. brunneifrons* as described by Hellmayr.

Above Machu Picchu (12,000 feet), 4.

(2656) OCHTHOECA OENANTHOIDES POLIONOTA Sclater and Salvin.

Ochthoeca polionota SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 599 (Pitumarca, S. Peru).

The type of this form, a male (No. 4821, Amer. Mus. Nat. Hist.), through exposure to light, is too much faded to be of value for color comparison. It measures, wing, 89.5 mm.; tail, 73 mm., and with this size virtually topotypical specimens from Cuzco and La Raya agree. Specimens from Tirapata, Limbani and Puno are intermediate in size between *polionota* and *oenanthoides*, but are nearer the former in color.

Cuzco, 1 male; La Raya, 3.

(2658) OCHTHOECA LEUCOPHRYS LEUCOMETOPA Sclater and Salvin.

Ochthoeca leucometopa SCLATER and SALVIN, Proc. Zool. Soc., 1877, p. 19 (Cuzco, Peru).
Octhoeca leucophrys SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 154 (Tinta).

Specimens from Calca, Pisac and Ttica-Ttica may be considered topotypical. Immature birds show to some extent the rufous wingbars which characterize true *leucophrys*.

Ollantaytambo, 4; Huaracondo Canyon, 7; Chospiyoc, 1; Calca, 2, Pisac, 4; Ttica-Ttica, 3; Cuzco, 7.

(2664) OCHTHOECA FRONTALIS SPODIONOTA Berlepsch and Stolzmann.

Ochthoeca spodionota BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 356 (Maraynioc, Peru).

In spite of the fact that Berlepsch and Stolzmann[47] after seeing Sclater and Salvin's type of *O. pulchella* from Bolivia, consider their *spodionota* inseparable, I find that an adult male from Machu Picchu is certainly not the same as two specimens from the trail to Santo Domingo in southeastern Peru. These birds have the superciliary yellow (less strong posteriorly), whereas in the Machu Picchu bird it is snowy white, only the portion before the eye being yellow. I have seen no specimens from Maraynioc, but the close faunal affinity of that locality with the humid Temperate Zone of the Urubamba region makes it more than probable that our specimen should be referred to *spodionota*.

Above Machu Picchu (12,000 feet), 1.

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[47] Proc. Zool. Soc., 1902, vol. 2, p. 57.

(2667a) OCHTHOECA LESSONI TECTRICIALIS, new subspecies.

Subspecific characters.—Underparts as in *Ochthoeca rufipectoralis* (d'Orbigny and Lafresnaye); upper parts more like those of *O. lessoni lessoni* Sclater, but back browner, head darker, greater coverts very narrowly, instead of broadly, tipped with rich cinnamon-rufous or hazel; inner wing-quills very faintly if at all margined with this color.

Type.—No. 145244, Amer. Mus. Nat. Hist., male adult, Huaracondo Canyon (altitude 10,000 feet), July 23, 1916; Geo. K. Cherrie.

Material examined.—*Ochthoeca lessoni tectricialis.* PERU: Type locality, 1 male, 1 female; above Machu Picchu (12,000 feet), 1 male, 1 female; above Torontoy (10,700–14,000 feet), 2 males. *Ochthoeca lessoni lessoni.* COLOMBIA: 11 males, 6 females. ECUADOR: Pichincha, 1; "Ambato," 1. *Ochthoeca rufipectoralis.* BOLIVIA: Incachaca, Prov. Cochabamba, 3 males, 5 females.

Remarks.—The form of *Ochthoeca lessoni* inhabiting southern Peru is an obvious intermediate between *O. lessoni lessoni* of Colombia and *O. rufipectoralis* of Bolivia. It is, however, nearer to the former and apparently does not intergrade with the latter, in which the wing-bars are wholly absent and the back is of nearly the same color as the crown, while in *tectricialis*, as in true *lessoni*, the back is decidedly browner than the crown and the greater coverts are definitely (if narrowly) tipped with cinnamon-rufous.

The proposed new form has the same deeply colored breast as in *rufipectoralis*, and, as in that species, this color more nearly reaches the base of the bill than in *lessoni*, in which the chin is gray.

(2670) OCHTHOECA THORACICA Taczanowski.

Ochthoeca thoracica TACZANOWSKI, Proc. Zool. Soc., 1874, p. 133 (Chilpes, Peru).

Above Torontoy (9,500–10,700 feet), 3.

(2678) MECOCERCULUS LEUCOPHRYS SETOPHAGOIDES (Bonaparte).

Tyrannula setophagoides BONAPARTE, Atti Sesta Riun. Sci. Ital., Milan, 1845, p. 405 (Bogotá).

Averaging slightly paler above but essentially agreeing with a large series from Colombia, showing no approach, therefore, to the Bolivian race. Specimens from Venezuela (near Mérida and Las Palmales in the Carúpano region) have the wing bars and margins to secondaries much paler, and in this respect are nearer to *leucophrys* than to *setophagoides*. They may stand as *M. leucophrys nigriceps* Chapman.

Above Machu Picchu (12,000 feet), 3; above Torontoy (14,000 feet), 5.

(2680) MECOCERCULUS STICTOPTERUS TAENIOPTERUS Cabanis.

Mecocerculus taeniopterus Cabanis, Journ. für Ornith., 1874, p. 98 (Peru).
Mecocerculus stictopterus euplastus Oberholser, Proc. U. S. Nat. Mus., 1903, p. 63 (Maraynioc, Peru). See Berlepsch, Ornis, vol. 14, 1907, p. 489.

Found in the humid Temperate Zone. Identified on the basis of comparison with specimens from the Temperate Zone in Ecuador and Colombia.

Above Torontoy (10,700 feet), 2; Occobamba Valley, 1.

(2680a) MECOCERCULUS SUBTROPICALIS Chapman.

Mecocerculus subtropicalis Chapman, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 262 (San Miguel Bridge, Urubamba Canyon, Peru).

Specific characters.—Similar to *Mecocerculus stictopterus taeniopterus* Cabanis, but back greener, cap grayer and less sharply defined from nape, wing coverts whiter and broader, ear coverts grayer, superciliary less extended posteriorly, abdominal region more yellow; size smaller.

An apparently distinct species of the Subtropical Zone.

San Miguel Bridge, 4; Idma, 3.

(2682) MECOCERCULUS POECILOCERCUS (Sclater and Salvin).

Serpophaga poecilocercus Sclater and Salvin, Nom. Av., 1873, p. 158 (Puellaro, Ecuador).

Agrees with Ecuadorian and Colombian specimens.

San Miguel Bridge, 1.

(2700) KNIPOLEGUS HETEROGYNA OCKENDENI Hartert.

Knipolegus aterrimus ockendeni Hartert, Bull. Brit. Orn. Club, vol. 23, 1908, p. 11 (Carabaya, Peru).

Our specimens agree with topotypical examples and differ from true *aterrimus* as described, and also in the lack of rufous in the wing of the female. In view of the close faunal affinities of the Subtropical Zone of southeastern Peru with that of Bolivia, the differences between the Peruvian and Bolivian forms of this bird seem to be of specific value. It is evident, however, on comparison with topotypes of *heterogyna* from Cajabamba, that the Peruvian forms are subspecifically related.

San Miguel Bridge, 5 males, 3 females; Torontoy, 5 males, 2 females.

(2718) MUSCISAXICOLA ALBIFRONS (Tschudi).

Ptyonura albifrons Tschudi, Faun. Per., Aves, p. 167, pl. 12, fig. 2 (Peru).
Muscisaxicola albifrons Berlepsch and Stolzmann, Ornis, 1906, p. 103 (Vilcabamba).

La Raya, 3.

(2720) MUSCISAXICOLA GRISEA Taczanowski.

Muscisaxicola grisea Taczanowski, Orn. Pérou, vol. 2, 1884, p. 213 (Maraynioc, Peru).

Agrees with the original description.

Above Ollantaytambo (13,000 feet), 1.

(2729) MUSCISAXICOLA ALBILORA Lafresnaye.

Muscisaxicola albilora Lafresnaye, Rev. et Mag. Zool., 1855, p. 60. (Type locality by subsequent designation "vicinity of Santiago, Chile.")

We have specimens of *albilora, rufivertex,* and a third unidentified species, all taken at Cuchacancha, Bolivia, in June, indicating the specific distinctness of these forms. One specimen each from Machu Picchu and Limbani, Peru, and from Cuchacancha, Bolivia, agree. I have seen none from Lake Junin.

Above Machu Picchu (14,000 feet), 1.

(2730) MUSCISAXICOLA RUFIVERTEX d'Orbigny and Lafresnaye.

Muscisaxicola rufivertex d'Orbigny and Lafresnaye, Syn. Av., pt. 1, 1837, p 66 (Cobija, Bolivia [=Chile],).—Sclater and Salvin, Proc. Zool. Soc., 1869, p. 154 (Tinta).

Muscisaxicola occipitalis Ridgway, Bull. U. S. Nat. Mus., vol. 10, 1887, p. 430 (Lake Titicaca).

These specimens agree closely with about an equal number from Cuchacancha (11,000 feet), near Cochabamba, Bolivia, and also two from the Titicaca district. One of the latter, and another from near Cuzco, have the under tail coverts tinged with rufous, a character attributed to *M. r. ruficrissa* Cory. I have seen no specimens from Cobija, "Bolivia" [=coast of Chile].

La Raya, 6; Calca, 1; Ttica-Ttica, 3; above Ollantaytambo (12,500 ft.), 1.

(2733) MUSCISAXICOLA MACULIROSTRIS d'Orbigny and Lafresnaye.

Muscisaxicola maculirostris d'Orbigny and Lafresnaye, Syn. Av., pt. 1, 1837, p. 66 (La Paz, Bolivia).—Sclater and Salvin, Proc. Zool. Soc., 1869. p. 154 (Tinta).

I detect no variation in a large series from Peru, Bolivia, and northern Chile.

Huaracondo Canyon, 2; Pisac, 2; Cuzco, 1; Ttica-Ttica, 8.

(2735) MUSCISAXICOLA FLUVIATILIS Sclater and Salvin.

Muscisaxicola fluviatilis Sclater and Salvin, Proc. Zool. Soc., 1866, p. 187 (Lower Ucayli), 1876, p. 16 (Potrero).—Berlepsch and Stolzmann, Ornis 1906, p. 85 (Santa Ana; Idma).

The presence of a species of this Temperate Zone genus in the Tropical Zone presents an exceptionally interesting problem in distribution.

Rio Comberciato, 1.

(2739) LESSONIA NIGER OREAS (Sclater and Salvin).

Centrites oreas SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 151 (Tinta, Peru).

Huaracondo Canyon, 1; Calca, 1; La Raya, 1.

(2773) TODIROSTRUM CINEREUM CINEREUM (Linnaeus).

Todus cinereus LINNAEUS, Syst. Nat., vol. 1, 1766, p. 178 (Surinam).
Todirostrum cinereum SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura; Potrero).

These specimens have somewhat more black on the head than those in a series from the lower Orinoco, but agree with them in other respects. They thus show no approach to the green-backed *T. c. coloreum* of southern Brazil. The white-throated *T. sclateri*, is evidently confined to the Pacific coast region.

Santa Ana, 6; Idma, 1; Chauillay, 1; San Miguel Bridge, 2.

(2802a) EUSCARTHMUS LEUCOGASTER Hellmayr.

Euscarthmus leucogaster HELLMAYR, Nov. Zool., vol. 21, 1914, p. 169 (Carabaya, S. E. Peru).

Agreeing with Hellmayr's description.

Rio Comberciato, 1.

(2805a) EUSCARTHMUS MARGARITACEIVENTER RUFIPES (Tschudi).

Orchilus rufipes TSCHUDI, Faun. Per., 1845-7, p. 165. (Peru).
Euscarthmus wuchereri SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Apparently to be referred to this form. I have no satisfactory material for comparison.[48]

Santa Ana, 2.

(2813) EUSCARTHMUS PYRRHOPS Cabanis.

Euscarthmus pyrrhops CABANIS, Journ. für Ornith., 1874, p. 98 (Tambopata, Peru).

Idma, 1.

(2820) CAENOTRICCUS RUFICEPS (Lafresnaye).

Muscicapa (*Todirostrum*) *ruficeps* LAFRESNAYE, Rev. Zool., 1843, p. 291 (Colombia).

An adult female has the head and throat somewhat paler than in Colombian specimens, but aside from this I am unable to find any difference between it and a Colombian series.

Cedrobamba, 1.

(2826) LOPHOTRICCUS SQUAMAECRISTATUS HYPOCHLORUS Berlepsch and Taczanowski.

Lophotriccus squamicristatus hypochlorus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 85 (Idma, Peru).
Lophotriccus squamaecristatus pileatus RIDGWAY (not Tschudi), Bull. U. S. Nat. Mus., No. 50, pt. 4, p. 371.

The characters on which this race are based are pronounced in specimens from Santo Domingo, southeastern Peru.

Idma, 3; Rio San Miguel (4,000 feet), 1.

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[48] See Berlepsch and Stolzmann, Proc. Zool. Soc., 1896, p. 360.

(2829) ORCHILUS ECAUDATUS (d'Orbigny and Lafresnaye).

Todirostrum ecaudatum d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 47 (Yuracares, Bolivia).

Found in the Tropical Zone. Compared with two Bolivian specimens (Rio Chimoré) the two birds listed below have the crown-cap larger, the superciliary more apparent, the sides with less greenish yellow. These differences may in part be due to the make-up of the skins.

Rio Cosireni, 2.

(2840) PHYLLOSCARTES VENTRALIS ANGUSTIROSTRIS (Lafresnaye and d'Orbigny).

Muscicapa angustirostris LAFRESNAYE and d'ORBIGNY, Syn. Av., pt. 1, 1837, p. 52 (Yungas, Bolivia). See von Berlepsch, Ornis, vol. 14, 1907, p. 486.

Leptopogon tristis SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 254 (Simacu, Bolivia).

On the basis of descriptions only, I refer to this species the specimens listed below, one from Santo Domingo, southeastern Peru, and two from Incachaca, Bolivia. The San Miguel Bridge birds have slightly less yellow on the throat, and the upperparts are somewhat duller with the crown less bright than the back. These birds are barely separable subspecifically from *Leptopogon flavovirens* Lawrence, of which we have the type, but in default of authentic specimens of true *ventralis* I make no further comment on their relationship.

San Miguel Bridge, 3.

(2847) MYIOSYMPOTES ACUTIPENNIS (Sclater and Salvin).

Hapalocercus acutipennis SCLATER and SALVIN, Proc. Zool. Soc., 1873, p. 137 (Bogotá).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 86 (Idma).

This species ranges from the Tropical to the Temperate Zone without apparent variation. I have only a female from Colombia.

Rio San Miguel, 2; Santa Ana, 2; Idma, 2; San Miguel Bridge, 3; Calca, 1.

(2863) OREOTRICCUS PLUMBEICEPS (Lawrence).

Pogonotriccus plumbeiceps LAWRENCE, Ann. Lyc. Nat. Hist. New York, vol. 9, 1870, p. 267 (Bogotá).

Compared with four specimens from Colombia, these Peruvian birds have the throat more extensively gray, the breast more olive.

Idma, 4.

(2871) SERPOPHAGA CINEREA CINEREA (Strickland).

Euscarthmus cinerea STRICKLAND, Ann. Mag. Nat. Hist., vol. 13, 1844, p. 414 (Chile-Bolivia).

Ranges from the Tropical to the Temperate Zones. Specimens from the upper zone, however, are slightly larger than those from the lower.

Idma, 1; San Miguel Bridge, 5; Chospiyoc, 2; Calca, 3; Pisac, 1.

(2880) ANAERETES PARULUS AEQUATORIALIS Berlepsch and Taczanowski.

Anaeretes parulus aequatorialis Berlepsch and Taczanowski, Proc. Zool. Soc., 1884, p. 296 (Cechce, W. Ecuador).

There is remarkably little variation in this species, it being possible to match specimens from Chile with others from Ecuador. When, however, comparable series are examined, it appears that birds from Colombia, Ecuador, and Peru have the crest less developed and not so black, the back averaging browner, the forehead and nape less streaked with white, the orbital and auricular region less black. In the Urubamba Valley this bird was found chiefly in the Subtropical Zone; in Colombia it reaches the Temperate Zone.

San Miguel Bridge, 2; Torontoy, 4; Occobamba Valley, 3; Machu Picchu, 1.

(2884) ANAERETES FLAVIROSTRIS Sclater and Salvin.

Anaeretes flavirostris Sclater and Salvin, Proc., Zool. Soc., 1876, p. 355 (Tilotilo, Bolivia).

This is apparently a Temperate Zone representative of *Anaeretes parulus*. Our specimens agree with others from Bolivia.

Ollantaytambo, 2; Huaracondo Canyon, 3; Calca, 1; Pisac, 1; Cuzco, 6.

(2885a) ANAERETES AGRAPHIA Chapman.

Anaeretes agraphia Chapman, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 263 (Idma, 9,000 feet, near Santa Ana, Peru).

Specific characters.—Quite unlike any described species of the genus, but most nearly resembling *Anaeretes agilis* Sclater, from which it differs in having no streaks above or below, the crest wholly black, etc.

Known only from the type, taken by Heller above Idma, at an altitude of 9,000 feet. This is probably, like *A. agilis*, a species of the Temperate Zone.

(2888a) MIONECTES STRIATICOLLIS POLIOCEPHALUS Tschudi.

Mionectes poliocephalus Tschudi, Faun. Per., 1845-46, p. 148, pl. 9, fig. 1 (Peru, "tiefern Waldregion").

Inhabits the Subtropical Zone. Differs from a topotypical series of true *striaticollis* of Bolivia, in having the white streaks of the throat less extended on to the breast; the sides and flanks less heavily streaked, the center of the belly somewhat deeper yellow and with fewer streaks; the plumbeous of the head more sharply defined, particularly on the sides of the neck, from the olive-green behind it. The Peruvian bird is intermediate between the Bolivian and Colombian forms, but differs sufficiently from both to be recognizable.

Idma, 6; San Miguel Bridge, 3.

(2895) LEPTOPOGON SUPERCILIARIS SUPERCILIARIS Tschudi.

Leptopogon superciliaris TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 275 (Cen. Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 86 (Idma).

Our specimens are less yellow below than Colombian specimens of *poliocephalus;* have the plumbeous cap more restricted, the wing-coverts less ochraceous. The differences are carried to the extreme in a series from Locotal, Bolivia, which, however, may well stand with the Peruvian race.

Idma, 4.

(2898) LEPTOPOGON RUFIPECTUS Taczanowski.

Leptopogon rufipectus TACZANOWSKI, Orn. Pérou, vol 2, 1884, p. 249 (Ropaybamba, Peru).

Agreeing with Taczanowski's description. Evidently related to *L. erythrops*, but the front is blackish and the throat and breast olive tinged with ochraceous.

Idma, 1; San Miguel Bridge, 4.

(2930) TYRANNISCUS CINEREICEPS (Sclater).

Tyrannulus cinereiceps SCLATER, Proc. Zool. Soc., 1860, p. 69 (Pallatanga, Ecuador).

Agreeing with specimens from Santa Elena and below Salento, Colombia.

Idma, 1; San Miguel Bridge, 1.

(2936a) TYRANNISCUS BOLIVIANUS VIRIDISSIMUS Sclater.

Tyranniscus viridissimus SCLATER, Proc. Zool. Soc., 1873, p. 782 (Cosnipata, S. Peru).

Tyranniscus bolivianus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 86 (Idma).

Found in the Subtropical Zone. Easily distinguishable from *T. b. bolivianus* by its much yellower coloration, particularly of the underparts.

Idma, 5.

(2938) ELAENIA FLAVOGASTER FLAVOGASTER (Thunberg).

Pipra flavogaster THUNBERG, Mém. Acad. St. Petersb., vol. 8, 1822, p. 286 (Brazil).

Elainea pagana SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Elaenea flavogaster BERLEPSCH and STOLZMANN, Ornis, 1906, p. 86 (Santa Ana).

An abundant species of the Tropical Zone.

Santa Ana, 10; Idma, 1.

(2942) ELAENIA GIGAS Sclater.

Elainea gigas SCLATER, Proc. Zool. Soc., 1870, p. 831 (Napo).

Agree essentially with Zamora, Ecuador, specimens.

Idma, 2.

(2944) ELAENIA CRISTATA Pelzeln.

Elainea cristata Pelzeln, Orn. Bras., 1869, pp. 107, 177 (Goiaz, Brazil).—Berlepsch and Stolzmann, Ornis, 1906, p. 86 (Santa Ana).

(2949) ELAENIA ALBICEPS MODESTA Tschudi.

Elaenia modesta Tschudi, Archiv für Naturg., 1844, vol. 1, p. 274 (W. Peru).
Elainea albiceps Sclater and Salvin, Proc. Zool. Soc., 1876, p. 16 (Huiro; Maranura; Potrero).
Elaenia albiceps modesta ? Berlepsch and Stolzmann, Ornis, 1906, p. 87 (Idma).

As von Berlepsch has remarked[49], it is uncertain whether *albiceps* is represented in Peru by one or more races. It is my present opinion that there is more than one race, but in expectation of the receipt of additional material I defer an attempt to determine the Peruvian status of this species. Meanwhile, I refer specimens from the Subtropical Zone to this race, which I assume is typically represented in our collections by a series from near Lima. The Temperate Zone form is evidently separable.

San Miguel Bridge, 5; Occobamba Valley (9,100 feet), 1; Torontoy, 1.

(2949a) ELAENIA ALBICEPS, new subspecies.

Specimens from the Temperate Zone evidently represent a zonal form of this species, but I await the receipt of additional material before presenting a definite conclusion in regard to their status.

Chospiyoc, 3; Pisac, 7 (2 juv.).

(2953) ELAENIA PALLATANGAE Sclater.

Elainea pallatangae Sclater, Proc. Zool. Soc., 1861, p. 407, pl. 41 (Pallatanga, Ecuador).

Von Berlepsch refers specimens from Marcapata, southern Peru, to this species. I have no topotypical material.

Torontoy, 1.

(2958) ELAENIA OBSCURA OBSCURA (Lafresnaye and d'Orbigny).

Muscipeta obscura Lafresnaye and d'Orbigny, Syn. Av., pt. 1, 1837, p. 48 (Yungas, Bolivia).
Elainea obscura Sclater and Salvin, Proc. Zool. Soc., 1876, p. 16 (Huiro).

Agrees with two topotypical specimens.

San Miguel Bridge, 1.

(2965) MYIOPAGIS VIRIDICATA, subspecies.

Elaenia viridicata Berlepsch and Stolzmann, Ornis, 1906, p. 87 (Santa Ana).
Elainea placens Sclater and Salvin, Proc. Zool. Soc., 1876, p. 16 (Maranura).

A single specimen, in poor condition, does not admit of satisfactory identification.

Idma, 1.

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[49] Ornis, vol. 24, 1907, p. 406.

(2979) SUBLEGATUS FASCIATUS FASCIATUS (Thunberg).

Pipra fasciata THUNBERG, Mém. Acad. Imp. Sci. St. Petersb., vol. 8, pp. 283, 285 (Brazil).

Sublegatus griseocularis SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Sublegatus fasciatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 87 (Santa Ana).

Found in the Tropical Zone.

Santa Ana, 5.

(2981) MYIOZETETES CAYENNENSIS (Linnaeus).

Muscicapa cayennensis LINNAEUS, Syst. Nat., vol. 1, 1766, p. 327 (Cayenne).

Myiozetetes cayennensis SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).

(2984) MYIOZETETES SIMILIS CONNIVENS Berlepsch and Stolzmann.

Myiozetetes similis connivens BERLEPSCH and STOLZMANN, Ornis, 1906, p. 87, (Santa Ana, Peru).

Agree, on the whole, with eastern Colombia specimens, but are smaller.

Idma, 3.

(2990) CONOPIAS CINCHONETI (Tschudi).

Tyrannus cinchoneti TSCHUDI, Faun. Pérou, 1844–45, p. 151, pl. 8, fig. 2 (Peru).

Colombian specimens are considerably smaller than this male from Peru, and if the difference proves to be constant it may warrant their subspecific separation.

Idma, 1.

(3007) MYIODYNASTES CHRYSOCEPHALUS CHRYSOCEPHALUS (Tschudi).

Scaphorhynchus chrysocephalus TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 272 (Peru).

Myiodynastes chrysocephalus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 88 (Idma).

Inhabits the Subtropical Zone.

San Miguel Bridge, 5.

(3013) HIRUNDINEA SCLATERI Reinhardt.

Hirundinea sclateri REINHARDT, Fuglef. Bras. Camp., 1870, p. 147 (Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 89 (Pacaymayo).

A rather rare inhabitant of the barren canyon sides in the Subtropical Zone.

Colpani, 1 male; Paltaybamba (5,000 feet), 1 male.

(3022) MYIOBIUS CINNAMOMEUS CINNAMOMEUS (d'Orbigny and Lafresnaye).

Muscipeta cinnamomea d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 49 (Yungas, Bolivia).

Myiobius cinnamomeus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 89 (Idma).

Common in the Subtropical Zone. I have seen no Bolivian specimens.

Idma, 2; San Miguel Bridge, 10; Torontoy, 1.

(3041) MYIOBIUS FASCIATUS SATURATUS Berlepsch and Stolzmann.

Myiobius naevius saturatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 88 (Chirimoto; Santa Ana, Peru).

Myiobius naevius SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Potrero).

Common in the Tropical Zone, ranging upward to the lower border of the Subtropical. Some of the specimens listed below can be matched by others from Colombia.

Santa Ana, 7; San Miguel Bridge, 3.

(3055) MYIOBIUS OCHRACEIVENTER (Cabanis).

Mitrephanes ochraceiventer CABANIS, Journ. für Ornith., 1873, p. 320 (Tilotilo, Bolivia).

Myiobius subochraceus SCLATER, Proc. Zool. Soc., 1887, p. 50 (Tilotilo, Bolivia).

Identified from descriptions. As Sclater remarked, the generic affinities of this species appear to be with *Myiobius pulcher.* It is certainly not referable to *Mitrephanes.* The adult male has an orange-flame crest as in *M. flavicans* and *M. pulcher.*

Idma (9,000 feet), 1 male adult.

(3052) EMPIDOCHANES POECILURUS PERUANUS Berlepsch and Stolzmann.

Empidochanes poecilurus peruanus BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 366 (Garita del Sol, Peru).

On comparison with Colombian specimens, a female exhibits the characters ascribed to this race.

San Miguel Bridge, 1.

(3056) MITREPHANES OLIVACEUS Berlepsch and Stolzmann.

Mitrephanes olivaceus BERLEPSCH and STOLZMANN, Ibis, 1894, p. 391 (Garita del Sol, Peru).

Found in the Subtropical Zone. I have no specimens for comparison, but the species is said to range from central Peru to Bolivia, and Idma is within the heart of this region.

Idma, 2.

(3058) SAYORNIS NIGRICANS LATIROSTRIS (Cabanis and Heine).

Aulanax latirostris CABANIS and HEINE, Mus. Hein., vol. 2, 1859, p. 68 (Bolivia).

Sayornis nigricans cineracea AUTHORS (not Lafresnaye). See Bangs and Penard, Bull. Mus. Comp. Zool., 1919, p. 28.

Sayornis cineracea angustirostris BERLEPSCH and TACZANOWSKI, Proc. Zool. Soc., 1896, p. 357 (La Merced, Peru); Ornis, 1906, p. 85 (Santa Ana).

In specimens from Colombia and Venezuela, the wing and tail average shorter, the bill larger than in those from Peru and Bolivia; but I can detect no diagnostic difference in color which would separate northern from southern birds, and consequently would apply the name given to the Bolivian bird to all South American specimens of *Sayornis nigricans.*

San Miguel Bridge, 4.

Measurements of males.

Locality.	Wing.	Tail.	Bill from nostril.
Yungas, Province of Cochabamba, Bolivia	90.5	79	11
Rio Inambari, Peru	91	79	11
San Miguel Bridge, Peru	93	79	11
Andalucia, Colombia	89	77	12
Rio Toché, Colombia	88.5	76.5	11.5
Near Mérida, Venezuela	88.5	77	11
Bermudez, Venezuela	88	74	11

(3064a) EMPIDONAX TRAILLI ALNORUM Brewster.

Empidonax traillі alnorum BREWSTER, Auk, 1895, p. 161 (Upton, Maine).

? *Empidonax pusillus traillі* BERLEPSCH and STOLZMANN, Ornis, 1906, p. 90 (Santa Ana, male Dec.).

Berlepsch and Stolzmann were uncertain whether to refer a single specimen in worn plumage to the eastern or western form of this species, and I am in the same position regarding a specimen from Cuzco. Ridgway records *alnorum* from Ecuador.

Cuzco, 1 (Nov. 30).

(3069) MYIOCHANES ARDOSIACUS ARDOSIACUS (Lafresnaye).

Tyrannula ardosiaca LAFRESNAYE, Rev. Zool., 1844, p. 80 (Colombia).

Inhabits the Subtropical Zone. There is a slight lightening on the abdominal region which apparently indicates an approach to *M. a. plebius.*

San Miguel Bridge, 4; Torontoy, 1.

(3084) MYIARCHUS TYRANNULUS CHLOREPISCIUS Berlepsch and Leverkühn.

Myiarchus tyrannulus chlorepiscius BERLEPSCH and LEVERKÜHN, Ornis, vol. 6, 1890, p. 16 (Cuyaba, Brazil).

Myiarchus erythrocercus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Myiarchus mexicanus chlorepiscius BERLEPSCH and STOLZMANN, Ornis, 1906, p. 89 (Santa Ana).

Berlepsch refers a specimen from Santa Ana to this race, but a single bird in our collection from the same locality is much grayer than any one of a large series from Chapada, Matto Grosso.

Santa Ana, 1.

(3088) MYIARCHUS CEPHALOTES Taczanowski.

Myiarchus cephalotes TACZANOWSKI, Proc. Zool. Soc., 1879, p. 671 (Tambillo Peru).

Two specimens apparently represent this species of which my only other Peruvian specimen (from Province of Huánaco) is in much worn plumage. Colombian specimens referred to this species [50] have the outer vane of the outer tail feather much paler than in these three Peruvian examples.

Chauillay, 1; Rio San Miguel (4,500 feet), 1.

(3089) MYIARCHUS PELZELNI Berlepsch.

Myiarchus pelzelni BERLEPSCH, Ibis, 1883, p. 139 (Bahia).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 89 (Santa Ana).

(3094) MYIARCHUS ATRICEPS Cabanis.

Myiarchus atriceps CABANIS, Journ. für Ornith., 1883, p. 215 (Tucuman, Argentina)

A male agrees with a specimen from Tucuman.

Torontoy, 1.

(3103) TYRANNUS MELANCHOLICUS MELANCHOLICUS Vieillot.

Tyrannus melancholicus VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 35, 1819, p. 84 (Paraguay).—SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro.—BERLEPSCH und STOLZMANN, Ornis, 1906, p. 90 (Idma).

Inhabits the Tropical Zone and ranges upward to the Subtropical.

Rio Cosireni, 1; Idma, 2; San Miguel Bridge, 4.

Family PIPRIDAE.

MANAKINS.

(3119) PIPRA CHLOROMEROS Tschudi.

Pipra chloromeros TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 271 (Peru).

Rio Cosireni, 1 female.

(3123) PIPRA LEUCOCILLA COMATA Berlepsch and Stolzmann.

Pipra leucocilla comata BERLEPSCH and STOLZMANN, Ibis, 1894, p. 392 (Chanchamayo, Peru).

Two specimens confirm the characters on which this race is based.

Idma, 2 males.

Family COTINGIDAE.

COTINGAS.

(3212) PLATYPSARIS AUDAX (Cabanis).

Hadrostomus audax CABANIS, Journ. für Ornith., 1873, p. 68 (Monterico, Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 90 (Casinchihua, 6,400 feet).

A specimen in the plumage of the female labeled "male, testes not enlarged," by Chapman. I have seen no other examples.

Midway between Torontoy and San Miguel Bridge, 1 female.

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[50] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 476.

(3218) PACHYRHAMPHUS VERSICOLOR VERSICOLOR (Hartlaub).

Vireo versicolor HARTLAUB, Rev. Zool., 1843, p. 289 (Colombia).

Pachyrhamphus versicolor BERLEPSCH and STOLZMANN, Ornis, 1906, p. 90 (Idma).

An adult male agrees with others from Colombia, but has the underparts with fewer bars.

San Miguel Bridge, 1 male.

(3270–3271) RUPICOLA PERUVIANA PERUVIANA Latham.

Rupicola peruviana LATHAM, Ind. Orn., 1790, vol. 2, p. 555, based on Le Coq-de-roche de Perou of Buffon, vol. 4, p. 437; Pl. Enl., p. 745.

Rupicola saturata CABANIS and HEINE, Mus. Hein., 1859, vol. 2, p. 99 (Bolivia).

Rupicola peruviana saturata BERLEPSCH and STOLZMANN, Ornis, 1906, p. 90 (Idma).

A common species in the Subtropical Zone at Idma, and also occurring in the Urubamba Canyon at Machu Picchu.

Further consideration of the subject leads me to believe that the view provisionally advanced in the Bulletin of the American Museum of Natural History[51] in regard to the proper application of the name *peruviana* is the correct one, namely, that the bird figured by Buffon is the southern, not the northern form of this species in which, as his plate shows, the black, subapical portion of the tertials is covered by the overlapping feathers, their exposed portion being wholly gray. In the northern bird the gray of the tertials is so restricted that the subapical black area is visible beyond the tip of the overlying feather. In body color Buffon's plate is more nearly like the northern bird, but without regard to the possibility of the plate having faded in the century and a quarter since it was colored, the tertial character described is the more pronounced and definite of the two and apparently compels us to apply Latham's name to the Peruvian form having the exposed portion of these feathers wholly gray.

It may be argued that specimens of the cock-of-the-rock from northern rather than southern Peru would be more likely to find their way into the hands of naturalists. But it must be remembered that Cuzco was one of the earliest places settled by Europeans and it had, therefore, long been a gateway for products of the montaña when Buffon's plate was made. We should, therefore, I think, restrict our evidence to the actual base of Latham's name—that is, Buffon's plate—and that, in my opinion, as well as that of several other naturalists to whom I have shown it, depicts the bird of southern Peru and eastern Bolivia. If this view be correct, *saturata* Cabanis and Heine becomes a synonym of *peruviana* Latham. I have seen no specimens from other parts of Peru. Those from Zamora in southeastern Ecuador are referable to the Colombia form *aurea*. Berlepsch and Stolzmann[52] refer specimens from the Chanchamayo district to "*peruana*," but at that time the distinctness of the south Peruvian form was not recognized, and it is not improbable that a re-examination will show the Chanchamayo bird to be nearer the southern than the northern form.[53] In that event *peruviana* and *aurea* will be found to intergrade between Zamora and the Chanchamayo district.

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[51] Vol. 36, 1917, p. 496.

[52] Ibis, 1896, p. 369.

Huiro, Lucumayo Valley (4,500 feet), 2 males; Idma, 4 males, 2 females; near San Miguel Bridge, 3 males.

(3302) HELIOCHERA RUBROCRISTATA (d'Orbigny and Lafresnaye).

Ampelis rubrocristata d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 39 (Yungas, Bolivia).

Found in the forests of the humid Temperate Zone. I have seen no Bolivian specimens, but those listed below agree with a large series from Colombia.

Cedrobamba, 2; Occobamba Valley (9,100 feet), 1; Lucma (9,000 feet), 1.

(3315) CEPHALOPTERUS ORNATUS Geoffroy.

Cephalopterus ornatus GEOFFROY., Ann. Mus., vol. 13, 1809, p. 238, pl. 17 (Brazil).

Agrees with a specimen from Buena Vista, Colombia.

Rio Comberciato, male adult.

Family HIRUNDINIDAE.

SWALLOWS.

(3337) ATTICORA FASCIATA (Gmelin).

Hirundo fasciata GMELIN, Sys. Nat., vol. 1, 1789, p. 1022 (Cayenne).

Rio Cosireni, 1 immature.

(3333) OROCHELIDON MURINA (Cassin).

Petrochelidon murina CASSIN, Proc. Acad. Nat. Sci. Phila., 1853, p. 370 (Ecuador).

Our specimens appear to be typical.

Ollantaytambo, 3; Machu Picchu (12,000 feet), 1; La Raya, 1.

(3339) OROCHELIDON ANDECOLA (Lafresnaye and d'Orbigny).

Hirundo andecola LAFRESNAYE and d'ORBIGNY, Syn. Av., pt. 1, 1837, p. 69 (La Paz, Bolivia).—? *Hirundo andicola* SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 151 (Tinta).

Taken only on the divide at La Raya where we also found *O. murina*. We have not, however, taken the former north of this point nor the latter south of it; *O. andecola* was common at Tirapata.

La Raya, 1.

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[53] Since the above was written, I have received two adult males from Utcuyacu, in the Chanchamayo district, which satisfactorily settle the proper allocation of Latham's name. In a word, they practically agree with Buffon's plate; that is, in general tone of color they are near the Colombian and Ecuadorian bird, but in the pattern of the tertials they exactly resemble the form from southern Peru and Bolivia. The latter character is so much the more pronounced and definite of the two that these birds should unquestionably be grouped with the southern rather than the northern form and they thus confirm the view expressed above.

(3342) PYGOCHELIDON CYANOLEUCA (Vieillot).

Hirundo cyanoleuca VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 14, 1817, p. 509 Paraguay).

Atticora cyanoleuca SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Abundant in the Subtropical Zone and, on the Pacific side, descending to sea level.

San Miguel Bridge, 4; Torontoy, 1.

(3344) ALOPOCHELIDON FUCATA (Temminck).

Hirundo fucata TEMMINCK, Pl. Col., vol. 4, 1823, pl. 161, fig. 1 (Brazil).

Agreeing with specimens from Chapada, Matto Grosso. This species does not appear to have been before recorded from Peru.

Below San Miguel Bridge, 2.

(3347) STELGIDOPTERYX RUFICOLLIS RUFICOLLIS (Vieillot).

Hirundo ruficollis VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 14, 1817, p. 523 (Brazil).

Agreeing with specimens from Rio and Bahia.

Below San Miguel Bridge, 2.

Family TROGLODYTIDAE.

WRENS.

(3385) ODONTORCHILUS BRANICKII BRANICKII (Taczanowski and Berlepsch).

Odontorhynchus branickii TACZANOWSKI and BERLEPSCH, Proc. Zool. Soc., 1885, p. 72, pl. 6, (Machay and Mapoto, Ecuador).

Two specimens agree with one from La Palma, Colombia, but have the crown somewhat deeper in color. This appears to be the second record of the species for Peru.

San Miguel Bridge, 2.

(3430) CISTOTHORUS PLATENSIS GRAMINICOLA Taczanowski.

Cistothorus graminicola TACZANOWSKI, Proc. Zool. Soc., 1874, p. 130 (Maraynioc, Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 74 (Puna of Idma).

Identified on geographical grounds only, since I have not seen typical specimens. The interscapular region has more white than in *aequatorialis*.

Cedrobamba, 1 female.

(3438) TROGLODYTES MUSCULUS PUNA Berlepsch and Stolzmann.

Troglodytes musculus puna BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 329 (Ingapirca).

A common form of the arid Temperate and Puna Zones. Specimens from La Raya and from near Cuzco are more deeply colored than those from Ollantaytambo, which show in their paler underparts an approach to the Santa Ana form. Specimens from Torontoy are near the Santa Ana form in color, but are intermediate in size; the series, as a whole, showing complete intergradation between the Puna and Tropical Zone races.

Ollantaytambo, 4; Chospiyoc, 2; Huaracondo Canyon, 2; Pisac, 2; Calca, 2; Ttica-Ttica, 4; Cuzco, 4; La Raya, 3.

(3442) TROGLODYTES MUSCULUS AUDAX Tschudi.

Troglodytes audax Tschudi, Faun. Peruana, 1845–46, p. 185 (Coast of Peru; *see* Berlepsch and Hellmayr, Journ. für Ornith., 1905, p. 6).

Twelve specimens from Santa Ana and La Merced agree in size and in color. In the first-named character they are like a large series from the vicinity of Lima, but as might be expected, they average darker in color than Pacific coast specimens. The difference, however, is slight and is doubly bridged by individual variation. That is, specimens in the Santa Ana series are as light as the average Pacific coast bird, while others from near Lima are as dark as any of our Santa Ana or La Merced birds. In spite, therefore, of the striking differences which exist between the climate of the eastern and western bases of the Andes, and notwithstanding the fact that these regions are separated by a mountain range reaching to the Puna Zone, essentially the same form of House Wren occurs in both.

As remarked under the preceding race, specimens from San Miguel Bridge and Torontoy approach the Puna Zone race.

Santa Ana, 5; San Miguel Bridge, 1; Torontoy, 2.

(3451) TROGLODYTES SOLSTITIALIS MACROURUS Berlepsch and Stolzmann.

Troglodytes solstitialis macrourus Berlepsch and Stolzmann, Proc. Zool. Soc., 1902, vol. 2, p. 55 (Central Peru).

These specimens do not conform exactly to the description of this form, and comparison with topotypes will be required to determine whether they are typical.

Torontoy (9,500–10,700 feet). 2.

(3458) HENICORHINA LEUCOPHRYS LEUCOPHRYS (Tschudi).

Troglodytes leucophrys Tschudi, Arch. für Naturg., 1844, p. 282 (Peru).
Henicorhina leucophrys Berlepsch and Stolzmann, Ornis, 1906, p. 74 (Idma).

Common in the Subtropical Zone.

Idma, 7; San Miguel Bridge, 8; Torontoy, 1.

Family CINCLIDAE.

DIPPERS.

(3480) CINCLUS LEUCOCEPHALUS Tschudi.

Cinclus leucocephalus Tschudi, Arch. für Naturg., 1844, p. 279 (Peru).

Common in the Subtropical Zone.

San Miguel Bridge, 2.

Family TURDIDAE.

THRUSHES.

(3508) PLANESTICUS SERRANUS (Tschudi).

Turdus serranus TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 280 (Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 73 (Idma).

A female is apparently to be referred to this species.

Torontoy (9,500 feet), 1 female.

(3511) PLANESTICUS LEUCOPS (Taczanowski).

Turdus leucops TACZANOWSKI, Proc. Zool. Soc., 1877, p. 331 (Ropaybamba, Peru).

PLANESTICUS, species.

A female from San Miguel Bridge and an unsexed immature specimen from Idma represent a species of the *phaeopygus* group unknown to me. I trust that with the receipt of additional material I shall be able satisfactorily to determine their identity.

(3544) SEMIMERULA GIGAS GIGANTODES (Cabanis).

Turdus gigantodes CABANIS, Journ. für Ornith., 1873, p. 315 (Maraynioc, Peru).

A Temperate Zone species. I have seen no topotypical examples. Birds from northern Peru agree with those from the western and central Andes of Colombia, which I have identified, therefore, as *gigantodes*.[54] The male listed below, however, is much blacker than my darkest Colombian specimens and is practically as dark below as above; in other words, it is an essentially *black* bird. The three females, moreover, are much paler, about the color of Colombian specimens. There is, therefore, apparently a sexual difference in the Peruvian birds not found in the Colombian form. Cabanis's description is based on a female, and it will consequently require comparison with specimens from Maraynioc to determine the identity of these south Peruvian birds.

Occobamba Valley, 9,100 feet, 1 male, 3 females.

(3548) SEMIMERULA CHIGUANCO (d'Orbigny and Lafresnaye).

Turdus chiguanco d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 16 (Tacna, Chile).

This species is distributed from the Pacific coast to at least 14,000 feet, and in spite of this remarkable range it apparently shows no geographical variation.

San Miguel Bridge, 9; Torontoy, 2; Huaracondo Canyon, 1; Chospiyoc, 1; Ollantaytambo, 3; Pisac, 2; Calca, 3; Ttica-Ttica, 3; Cuzco, 1; La Raya, 1.

CATHARUS, species.

A female in juvenal plumage from the Occobamba Valley (9,100 feet) I am unable to identify.

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[54] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 537.

Family VIREONIDAE.

VIREOS.

(3563) VIREOSYLVA OLIVACEA (Linnaeus).

Muscicapa olivacea LINNAEUS, Syst. Nat., vol. 1, 1766, p. 327 (Carolina).
Vireosylvia olivacea SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura; Huiro).

(3565) VIREOSYLVA CHIVI CHIVI (Vieillot).

Sylvia chivi VIEILLOT, Nouv. Dict. d'Hist. Nat., vol. 11, 1817, p. 174 (Paraguay).
Vireo chivi BERLEPSCH and STOLZMANN, Ornis, 1906, p. 76 (Santa Ana).

Ranging from the Tropical to the Subtropical Zone. These specimens are considerably brighter than others from Sao Paulo and near Buenos Aires, but I have not material with which to settle their status satisfactorily.

Santa Ana, 2; Idma, 2; San Miguel Bridge, 7.

(3568) VIREOSYLVA JOSEPHAE JOSEPHAE (Sclater).

Vireo josephae SCLATER, Proc. Zool. Soc., 1859, p. 137, pl. 154 (Pallatanga, Ecuador).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 76 (Idma).

Inhabits the Subtropical Zone. These specimens agree with four from Ecuador.

Idma, 2; San Miguel Bridge, 6; Torontoy, 3.

Family MNIOTILTIDAE.

WOOD WARBLERS.

(3617) COMPSOTHLYPIS PITIAYUMI ELEGANS Todd.

Compsothlypis pitiayumi elegans TODD, Ann. Carn. Mus., vol. 8, 1912, p. 204 (Tara Mt., Ven.).
Parula pitiayumi SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).
Compsothlypis pitiayumi BERLEPSCH and STOLZMANN, Ornis, 1906, p. 74 (Santa Ana).

Our specimens average slightly larger than those from east of Bogotá, Colombia, but agree with them in color. This form appears, therefore, to range down the Amazonian slopes and base of the Andes from Venezuela to Peru. I have not the material to determine its distribution eastward in the forests of Amazona. Chapada, Matto Grosso specimens are referable to true *pitiayumi*.

Santa Ana, 1 male, 3 females; Idma, 1 female juv.; Chauillay, 1 ?; San Miguel Bridge, 5 males, 1 female.

(3628) DENDROICA CAERULEA (Wilson).

Sylvia cerulea WILSON, Amer. Orn., vol. 2, 1810, p. 141, pl. 17, fig. 5 (Pennsylvania).
Dendroica rara BERLEPSCH and STOLZMANN, Ornis, 1906, p. 74, Idma (1 male, Oct. 29).

(3639) GEOTHLYPIS AEQUINOCTIALIS CUCULLATA (Latham).

Sylvia cucullata LATHAM, Ind. Orn., vol. 2, 1790, p. 528 (no locality given; Brabourne and Chubb give "Brazil"; I suggest adding Rio Janeiro).
Geothlypis canicapilla assimilis BERLEPSCH and STOLZMANN, Ornis, 1906, p. 75, Chirimoto, Peru; specimens from Santa Ana and Maranura).

Our specimens have smaller bills and longer tails than most examples from eastern Brazil, but resemble in size specimens from Chapada, Matto Grosso. I can find no diagnostic differences in color between our Peruvian birds, a large series from Chapada and seven adult males from São Paulo, Rio, and Bolivia, and consequently do not consider *assimilis* of Berlepsch and Stolzmann worthy of recognition.

Idma, 2 females (Oct. 22, breeding); Santa Ana, 1 male, 2 females.

(3647) WILSONIA CANADENSIS (Linnaeus).

Muscicapa canadensis LINNAEUS, Syst. Nat., vol. 1, 1766, p. 327 (Canada).
Sylvania canadensis BERLEPSCH and STOLZMANN, Ornis, 1906, p. 76, Idma (1 female, July).

(3649) MYIOBORUS VERTICALIS (d'Orbigny and Lafresnaye).

Setophaga verticalis d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 53 ("Ayupaya, Boliviana").—SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro, Potrero).

Common in the Subtropical Zone. Peruvian and Bolivian specimens agree and have somewhat more white in the tail than Colombian specimens.

Idma, 2 males, 2 females; San Miguel Bridge, 3 males, 4 females, 1 ?.

(3657) MYIOBORUS MELANOCEPHALUS MELANOCEPHALUS (Tschudi).

Setophaga melanocephala TSCHUDI, Wieg. Arch., vol. 1, 1844, p. 276 (Peru).

Common in the Subtropical Zone.

San Miguel Bridge, 7; Torontoy, 7.

(3663a) BASILEUTERUS LUTEOVIRIDIS SUPERCILIARIS Chapman.

Basileuterus luteoviridis superciliaris CHAPMAN, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 265 (above Torontoy, 14,000 feet, Urubamba Canyon, Peru).

Subspecific characters.—Similar to *Basileuterus luteoviridis luteoviridis* (Bonaparte) of Colombia, but averaging slightly smaller, with a longer bill, rictal bristles more developed; the entire upper parts decidedly browner, the yellow superciliary much broader, brighter, in some specimens broader even than in "*Myiothlypis*" *nigrocristatus*, when it leaves an olive-green area on the crown about equal to the black area in the crown of that species. Differing from *Basileuterus luteoviridis striaticeps* Cabanis, and from *B. l. signatus* Berlepsch and Stolzmann, through the lack of even a trace of black on the forehead and crown, which is exactly concolor with the back; from specimens of *signatus* which lack black on the crown, it differs as it does from true *luteoviridis* and, furthermore, in being larger; wing, 69.5; tail, 57; culmen, 12 mm.

Above Torontoy, 3; Cedrobamba, 1.

This form is apparently a Temperate Zone representative of *Basileuterus luteoviridis signatus* which occurs on the same mountains in the Subtropical Zone. Its zonal relations are presumably with "*Myiothlypis*" *striaticeps* from Maraynioc in the humid Temperate Zone east of the Junin region.

(3665) BASILEUTERUS LUTEOVIRIDIS SIGNATUS Berlepsch and Stolzmann.

Basileuterus signatus Berlepsch and Stolzmann, Ornis, 1906, p. 74 (Idma, Peru).

Inhabits the Subtropical Zone. Having apparently but a single specimen from Peru and several from Bolivia, the describers of this race apparently either based their diagnosis chiefly on the Bolivian birds or else their Peruvian specimen was not representative. Twelve specimens from near the type locality in Peru and five from the same zone (Subtropical) in Bolivia, have the blackish forehead and lines on the side of the crown bordering the yellow superciliaries which form the principal characters of this race. It is shown in only two of the Peruvian birds, and then but faintly, while it is present in all five of the Bolivian birds. Should additional material confirm this difference it may be necessary to restrict the name *signatus* to the Peruvian bird which, aside from the character mentioned, is distinguished from true *luteoviridis* only by its smaller size, and give a new name to the Bolivian form. Four males from San Miguel Bridge measure: Wing, 59–61; tail, 54–60 mm.

I have not seen "*Myiothlypis*" *euophrys* Sclater and Salvin, of the same region in Bolivia whence come the specimens I have referred to *signatus*. It is evidently closely related to and perhaps identical with that form.

San Miguel Bridge, 4 males, 2 females; Torontoy, 2 males, 4 females.

(3669) BASILEUTERUS TRISTRIATUS (Tschudi).

Myiodioctes tristriatus Tschudi, Arch. für Naturg., 1844, p. 283 (San Pedro, Peru).

Inhabits the Subtropical Zone.

Idma, 4.

(3674) BASILEUTERUS CORONATUS (Tschudi).

Myiodioctes coronatus Tschudi, Arch. für Naturg., 1844, vol. 1, p. 283 (Peru).
Basileuterus coronatus Berlepsch and Stolzmann, Ornis, 1906, p. 75 (Idma).

Inhabits the Subtropical Zone.

Idma, 4; San Miguel Bridge, 4; near Torontoy, 1.

Family MOTACILLIDAE.

PIPITS, WAGTAILS.

(3694a) ANTHUS BOGOTENSIS IMMACULATUS Cory.

Anthus bogotensis immaculatus CORY, Field Mus. Pub., No. 190, 1916, p. 345 (mountains east of Balsas, Peru).

A female from La Raya and a male from Junin have the flanks practically unstreaked and should doubtless be referred to the form described from northern Peru by Cory. Five specimens from Bogotá all have the flanks conspicuously streaked.

La Raya, 1.

(3695) ANTHUS FURCATUS d'Orbigny and Lafresnaye.

Anthus furcatus d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 27 (Patagonia).

In addition to the specimen from Ttica-Ttica, we have nine others from Tirapata. I have seen no topotypical examples.

Ttica-Ttica, 1.

Family FRINGILLIDAE.

FINCHES, SPARROWS, GROSBEAKS, Etc.

(3705) PHEUCTICUS CHRYSOCEPHALUS CHRYSOGASTER (Lesson).

Pitylus chrysogaster LESSON, Cent. Zool., 1830, pl. 67 (Chile).

Rio San Miguel, 4,500 feet, 1 female.

(3707a) PHEUCTICUS UROPYGIALIS TERMINALIS Chapman.

Pheucticus uropygialis terminalis CHAPMAN, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 266 (San Miguel Bridge, Urubamba Canyon, Peru).

Subspecific characters.—In the comparative absence of black markings on the sides and flanks, and in the large size of the white endings of the greater wing coverts, resembling *Pheucticus uropygialis meridensis* Riley, of Venezuela; in the extent of yellow anteriorly on the bases of the feathers of the interscapulium nearer to *meridensis* than to *Pheucticus uropygialis uropygialis* Sclater, of Colombia; differing from both *meridensis* and true *uropygialis* in having large white terminal, or slightly subterminal, rounded spots on the upper tail coverts instead of small white or yellowish transverse subterminal marks on these feathers; lower tail coverts whiter; tibiae yellower.

San Miguel Bridge, 1; Chauillay, 1.

(3765) SPOROPHILA GUTTURALIS INCONSPICUA Berlepsch and Stolzmann.

Sporophila gutturalis inconspicua BERLEPSCH and STOLZMANN, Ornis, 1906, p. 84 (Santa Ana, Peru).

Spermophila gutturalis SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

Inhabits the Tropical Zone. In the almost complete absence of black on the head, the males in our series resemble three birds from the eastern base of the Colombian Andes to which I have before referred,[55] but the throat and breast are darker and the dark area is more extensive in the Peruvian birds, which, in this respect, resemble specimens from the interior of Colombia. I have no Bahia examples.

Santa Ana, 3 males, 2 females; Idma, 1 male; San Miguel Bridge, 1 female.

(3778) SPOROPHILA OBSCURA (Taczanowski).

Spermophila obscura Taczanowski, Proc. Zool. Soc., 1874, p. 519 (Paltaypampa, Peru).
Sporophila obscura Berlepsch and Stolzmann, Ornis, 1906, p. 84 (Santa Ana).

An abundant inhabitant of the Tropical Zone, ranging upward to the lower border of the Subtropical Zone.

Rio Cosireni, 1; Santa Ana, 9; Idma, 3; Chauillay, 1; San Miguel Bridge, 5.

(3772) CATAMENIA INORNATA INORNATA (Lafresnaye).

Linaria inornata Lafresnaye, Rev. Zool., 1847, p. 75 (Bolivia).

These specimens agree in size with others from Oroya, Peru. I have seen none from Bolivia.

Ttica-Ttica, 1 male; above Machu Picchu, 12,000 feet, 1 female.

(3777a) CATAMENIA ANALOIDES GRISEIVENTRIS Chapman.

Catamenia analoides griseiventris Chapman, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 267 (Cuzco, Peru).
Catamenia analis Sclater and Salvin, Proc. Zool. Soc., 1869, p. 152 (Tinta).

Subspecific characters.—Male similar to male of *Catamenia analoides analoides* (Lafresnaye) of the Peruvian coast region, but abdominal region grayer, less white, the under parts, therefore, nearly uniform in color; second to sixth primaries (from without) with less white on their outer webs at base; lower tail coverts averaging paler and usually without the buffy tips which are always present in true *analoides*.

Cuzco, 1 male, 1 female; Pisac, 4 males, 2 females; Chospiyoc, 1; Huaracondo Canyon, 3; above Torontoy, 1.

A form of the arid Temperate Zone ranging from Southern Peru to Ecuador.

(3789) VOLATINIA JACARINI JACARINI (Linnaeus).

Tanagra jacarini Linnaeus, Syst. Nat., vol. 1, 1766, p. 314 ("Brasilia").

Santa Ana, 1 male.

(3803) SALTATOR MAXIMUS (P. L. S. Müller).

Tanagra maximus P. L. S. Müller, Syst. Nat., 1776, p. 159 (Cayenne).
Saltator magnus Sclater and Salvin, Proc. Zool. Soc., 1876, p. 16 (Huiro).—Berlepsch and Stolzmann, Ornis, 1906, p. 83 (Santa Ana).

Peruvian and Bolivian specimens are smaller with smaller bills than those from British Guiana, but agree with them in color.

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[55] Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 558.

(3809) SALTATOR CAERULESCENS AZARAE d'Orbigny.

Saltator azarae d'ORBIGNY, Voy. Amer. Mérid., Ois., 1836, p. 287 (Moxos and Santa Cruz, Bolivia).

Agrees with a specimen from the Falls of the Madeira.

Santa Ana, 1.

(3814) SALTATOR ALBOCILIARIS (Philippi and Landbeck).

Pitylus albociliaris PHILIPPI and LANDBECK, Arch. für Naturg., 1863, p. 122 (Socoroma, "Peru" [=Chile]).

Saltator laticlavius SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 151 (Tinta).

Common in the arid Temperate Zone wherever there is scrubby tree growth.

Above Torontoy, 1; Ollantaytambo, 5; Huaracondo Canyon, 5; Chospiyoc, 2; Occobamba Valley, 1; Pisac, 6; Puquiura, 1; Cuzco, 1.

(3828) SPINUS ATRATUS (d'Orbigny and Lafresnaye).

Carduelis atrata d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 83 (La Paz, Bolivia).

Chrysomitris atrata SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 152 (Pitumarca).

The yellow of the abdominal area is somewhat more extensive and, with other yellow areas, paler in color than in specimens from northern Argentina. I have none from Bolivia.

Ollantaytambo, 1 female; La Raya, 3 males, 3 females, 1 ?.

(3834) SPINUS ICTERICUS PERUANUS Berlepsch and Stolzmann.

Spinus ictericus peruanus BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 352 (La Merced, Peru).

I have seen no specimens from La Merced, but have three from Oroya and one from Lima. The latter has the back brighter and under parts darker, and is smaller than the former. Possibly there is a littoral as well as an Andean race when the Oroya birds would doubtless be nearer true *peruanus*, although Berlepsch, with some reservations, refers Lima specimens to it.

Our series from 10,000 feet and upward in southern Peru agrees with the Oroya specimens, but two males from near San Miguel Bridge (4,500 and 6,000 feet), although they are like the remaining specimens in color, are considerably smaller (wing, 62 and 66 mm.). The Bolivian form, of which I have an excellent series, is distinguished by its paler coloration and greater extent of yellow on the tail rather than by the characters assigned to it by its describer.

San Miguel Bridge, 2 males; Chospiyoc, 2 males, 1 female; Ttica-Ttica, 1 male, 2 females; Cuzco, 3 males, 2 females; Pisac, 4 males; La Raya, 1 male, 1 female.

(3848) SYCALIS ARVENSIS (Kittlitz).

Fringilla arvensis KITTLITZ, Mém. Acad. Imp. Sci. St. Petersb., 1835, vol. 2, p. 470 (Chile).

Huaracondo Canyon, 1 male.

(3856) MYOSPIZA AURIFRONS PERUANA (Bonaparte).

Coturniculus peruanus Bonaparte, Consp. Av., vol. 1, 1850, p. 481 ("Am. m. occ.," I suggest, Santa Ana, Peru).

Myospiza peruana Berlepsch and Stolzmann, Ornis, 1906, p. 84 (Santa Ana).

Inhabits the Tropical Zone. There is an obvious and fairly constant difference separating birds from southern Peru and Bolivia from those of southeastern Ecuador (Zamora) and southeastern Colombia. The more southern birds have the dark centers of the feathers of the back smaller, and their margins much grayer, less olivaceous than the northern birds. These characters are not so noticeable in worn specimens but are usually diagnostic. The Zamora birds doubtless typically represent *aurifrons aurifrons*, and I assume that Bonaparte's name is applicable to the southern form. In addition to the Urubamba specimens listed below, we have examples of *peruana* from the following localities: Peru: Rio Inambari, 1; Rio Javari, 3; Astillero, 1; Candamo, 1; La Pampa, 2. Bolivia: Todos Santos, Province of Cochabamba, 1; Yungas, Province of Cochabamba, 2.

Rio Comberciato, 1; Idma, 1; Santa Ana, 1.

(3863) POOSPIZOPSIS CAESAR (Sclater and Salvin).

Poospiza caesar Sclater and Salvin, Proc. Zool. Soc., 1869, p. 152, pl. 13 (Tinta, Peru).—Berlepsch and Stolzmann, Ornis, 1906, p. 103 (Curahuasi).

Ollantaytambo, 1 male; Chospiyoc, 2 males; Huaracondo Canyon, 1 male, 1 ?; Poquiura, 1 female; Pisac, 1 male; Calca, 1 male, 1 female; Cuzco, 1 male, 2 females; La Raya, 1 female.

(3882) BRACHYSPIZA CAPENSIS PERUVIANA (Lesson).

Pyrgita peruviana Lesson, Rev. Zool., 1839, p. 45 (Lima, Peru).

An abundant species ranging from the Pacific coast to the tableland, but on the eastern slope we did not take it below the Subtropical Zone. Our series appears to agree with specimens from Lima.

San Miguel Bridge, 3; Idma, 1; Torontoy, 1; Ollantaytambo, 2; Huaracondo Canyon, 2; Ttica-Ttica, 4; Cuzco, 6; Calca, 1; La Raya, 6.

(3903) PSEUDOCHLORIS OLIVASCENS CHLORIS (Tschudi).

Sycalis chloris Tschudi, Faun. Per. Aves, 1846, p. 216.—Sclater and Salvin, Proc. Zool. Soc., 1869, p. 153 (Tinta).

Inhabits the Puna Zone. Specimens from Tirapata, taken in late July and early August, are completing the molt and are consequently in fresh plumage. A male which is evidently fully adult is bright olive-yellow above, the rump and upper tail coverts being nearly pure yellow. A second male has the back washed with brownish, but the upper tail coverts are nearly as bright as in the first-named male. A male from Pisac (April 18) is in worn plumage and differs so widely from either of the Tirapata birds that it is difficult to believe they represent the same species. While wear might change the back of the immature Tirapata male to the dull greenish olive of that of the Pisac bird, it is difficult to understand how its bright yellow upper tail coverts could become as dull as they are in the male from Pisac. The latter closely resembles a male in comparable plumage from Bolivia labeled by von Berlepsch "*olivascens*," but is slightly smaller. (wing, 80 mm., tail, 53 mm., as compared with 87 mm., tail 54.5 mm.). Menegaux gives no measurements for the form from Pulcayo, Bolivia, for which he proposes the name *Pseudochloris olivascens berlepschi*,[56] and I am therefore unable to consider it in this connection. However, if the Cuzco form be valid, the Pisac bird should be referred to it. The status of the Tirapata bird is not settled by the material at hand.

Pisac, 1 male.

(3905a) PSEUDOCHLORIS UROPYGIALIS CONNECTENS Chapman.

Pseudochloris uropygialis connectens Chapman, Bull. Am. Mus. Nat. Hist., vol. 41, 1919, p. 329 (La Raya, Peru).

Subspecific characters.—Most nearly related to *Pseudochloris uropygialis uropygialis* (d'Orbigny and Lafresnaye) of Bolivia, but male with anterior portion of auriculars and, usually, region below the eye olive-yellow, yellow more extensive on sides and flanks; female with the whole head yellower than in *Pseudochloris uropygialis uropygialis*.

La Raya, 4 males, 3 females; Ttica-Ttica, 1 male.

(3913) PHRYGILUS GAYI PUNENSIS Ridgway.

Phrygilus punensis Ridgway, Proc. U. S. Nat. Mus., 1887, p. 434 (basin of Lake Titicaca in Peru and Bolivia).

Found in the open plains of the tableland. There is much variation in color in the specimens listed below. Some have the upper parts uniform olive-green, in others it is warm golden brownish. An adult from La Paz and another from Tirapata can be closely matched. Specimens from Oroya (=*chloronotus* Berlepsch and Stolzmann) also find their duplicates. I use the above combination of names without having determined the relationships of *gayi* and *aldunatei*.

La Raya, 8 males, 3 females; Cuzco, 10 males, 5 females; Huaracondo Canyon, 1 male.

(3922) PHRYGILUS FRUTICETI (Kittlitz).

Fringilla fruticeti Kittlitz, Kupf. Vög., 1832, p. 18, pl. 23, fig. 1 (near Valparaiso, Chile).

Phrygilus fruticeti Sclater and Salvin, Proc. Zool. Soc., 1869, p. 152 (Tinta).—Berlepsch and Stolzmann, Ornis, 1906, p. 103 (Cuzco; Luatanay).

Our series contains specimens in both worn (April) and fresh (October, November) plumage. They agree with others from near Santiago.

La Raya, 6 males, 1 female; Cuzco, 2 males; Pisac, 1 male; Huaracondo Canyon (11,000 feet), 1 male (breeding, Apr. 10).

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[56] Rev. Franc. d'Orn., 1910, p. 124.

(3925) PHRYGILUS UNICOLOR UNICOLOR (d'Orbigny and Lafresnaye).

Emberiza unicolor d'ORBIGNY and LAFRESNAYE, Mag. de Zool., 1837, p. 79 (Cordillera of Tacora, Peru).

Taken only by Heller. I am surprised at our failure to secure this species at Tirapata or La Raya.

Occobamba Pass, above Ollantaytambo, 13,000 feet, 2 males; above Machu Picchu, 14,000 feet, 1 male, 1 female (breeding, June 5).

(3929) PHRYGILUS ALAUDINUS EXCELSUS Berlepsch.

Phrygilus alaudinus excelsus BERLEPSCH, Proc. Fourth Int. Cong., 1907, p. 351 (Vacas, Bolivia).

This is a very common bird at Tirapata, where we took 16 specimens in three days, but it was not found north of La Raya. Our specimens agree with a topotypical series from Bolivia, and comparison of both lots with Chilean material confirms the validity of this race.

La Raya, 3 males.

(3930) PHRYGILUS PLEBEJUS Tschudi.

Phrygilus plebejus TSCHUDI, Arch. für Naturg., 1844, p. 290 (Peru).
Phrygilus plebeius SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 152 (Tinta).

An abundant species of the Puna Zone.

La Raya, 6 males, 5 females; Pisac, 1 male; Cuzco, 11 males, 6 females; Occobamba Pass, 13,000 feet, 1 male.

(3939) DIUCA SPECULIFERA (d'Orbigny and Lafresnaye).

Emberiza speculifera d'ORBIGNY and LAFRESNAYE, Mag. de Zool., Syn. Av., pt. 1, p. 78, 1837 ("in Bolivia, in summis Andibus").

I have seen no Bolivian specimens.

La Raya, 4 males.

(3941) CORYPHOSPINGUS CUCULLATUS (P. L. S. Müller).

Fringilla cucullata P. L. S. MÜLLER, Syst. Nat., vol. 1, 1776, p. 166 (Cayenne).
Coryphospingus cristatus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Potrero).
Coryphospingus cucullatus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 84 (Santa Ana; Pampa de Derrumbe; Idma).

Inhabits the Tropical Zone. Our specimens are somewhat paler than a male in worn plumage from Surinam loaned me by Mr. T. E. Penard.

Rio Cosireni, 2 males; Santa Ana, 1 male, 2 females; Chauillay, 1 male.

(3992a) ATLAPETES CANIGENIS Chapman.

Atlapetes canigenis CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 330 (Torontoy, Urubamba Canyon, Peru).

Specific characters.—Most nearly resembling *Atlapetes castaneifrons* Sclater and Salvin, of Venezuela, but with no white malar stripe or black mystacal streak; anteorbital region grayish black

Doubtless a species of the humid Temperate Zone.

Torontoy, 1 female; above Torontoy, 9,500 feet, 1 male (breeding, May 2), 1 female; Occobamba Valley, 1 female.

(4003) BUARREMON BRUNNEINUCHA (Lafresnaye).

Embernagra brunnei-nucha LAFRESNAYE, Rev. Zool., 1839, p. 97 (Mexico).

Buarremon brunneinuchus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 83 (Idma).

Not uncommon in the Subtropical Zone. Our specimens agree with others from Colombia.

Idma, 1 female (breeding, Oct. 25); San Miguel Bridge, 2 males, 3 females; Torontoy, 2 males, 1 ?.

Family COEREBIDAE.

HONEY CREEPERS.

(4027) DIGLOSSA SITTOIDES SITTOIDES (d'Orbigny and Lafresnaye).

Serrirostrum sittoides d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 2, 1838, p. 25 (Yungas, Vallegrande, Bolivia).

Diglossa sittoides BERLEPSCH and STOLZMANN, Ornis, 1906, p. 76 (Idma.).

Found in the Subtropical Zone. Our specimens agree with others from Bolivia.

Idma, 1 male; San Miguel Bridge, 4 males, 1 female.

(4030) DIGLOSSA BRUNNEIVENTRIS Lafresnaye.

Diglossa brunneiventris LAFRESNAYE, Rev. Zool., 1846, p. 318 (Peru).—SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 151 (Tinta).

A species of the Temperate Zone which, however, evidently ranges as low as 8,000 feet. It frequents the low bushy growths along water courses.

Cuzco, 4 males; Ttica-Ttica, 1 male, 1 female; Ollantayambo, 1 female; Torontoy, 8,000 feet, 1 male (breeding Nov. 2).

(4033a) DIGLOSSA MYSTACALIS ALBILINEA Chapman.

Diglossa mystacalis albilinea CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 331 (Cedrobamba Ruins, Peru).

Subspecific characters.—Similar to *Diglossa mystacalis mystacalis* Lafresnaye of Bolivia, but with the mystacal stripe light ochraceous-buff or creamy white anteriorly, more ochraceous posteriorly, instead of "pale red" (from Lafresnaye and Sclater) or tawny; and consequently resembling in this character *Diglossa pectoralis* Cabanis.

Inhabits the humid Temperate Zone, where six specimens were secured by Heller. The species has not been recorded from Peru.

Cedrobamba, altitude 12,000 feet; timberline, 3 male adults (2 breeding, May 26); 1 female adult, 2 male juv.

(4041a) DIGLOSSA PERSONATA MELANOPIS Tschudi.

Diglossa melanopis TSCHUDI, Wiegm. Arch., 1844, p. 294 (Peru).
Diglossa personata AUTHORS (Peruvian and Bolivian records).

Comparison of 4 specimens from Peru and 16 from Bolivia, with a very large series from Colombia, shows that this southern form, heretofore synonymized with true *personata*, may be recognized by its generally duller bluer color, especially on the wings, and by the absence of the conspicuous whitish edgings on the lower tail coverts present in all our adult Colombian examples.

As in Colombia, the species in Peru appears to range from the upper part of the Subtropical to the Temperate Zone.

Above Machu Picchu (12,000 feet), 1 male; Torontoy, 9,500 feet, 1 female; 14,000 feet, 1 male; Occobamba Valley, 9,100 feet, 1 male.

(4042) DIGLOSSA INDIGOTICA Sclater.

Diglossa indigotica SCLATER, Ann. Mag. Nat. Hist., 1856, p. 467 (Ecuador).

This species appears not to have been recorded from Peru, but the specimen listed below, together with 9 from Inca Mine, agree with one labeled as coming from Ecuador.

Rio San Miguel, 4,500 feet, 1 male (breeding, Oct. 5).

(4047) OREOMANES FRASERI Sclater.

Oreomanes fraseri SCLATER, Proc. Zool. Soc., 1860, p. 75, pl. 159 (Panza, Ecuador).—VON BERLEPSCH, Ornis, vol. 11, 1900–01, p. 197 (Anta, Peru).—HELLMAYR, Verh. der Orn. Gesell. Bayern, vol. 11, 1912, p. 159 (Carabaya, Peru).
Oreomanes binghami CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 331.

A species of the Temperate Zone which is unknown between southern Peru and central Ecuador. An even more striking hiatus occurs in the recorded range of *Diglossa brunneiventris* which is unknown between central Peru and northern Colombia. Such gaps in distribution indicate lack of continuity in the Temperate Zone itself, and when the species found in these Temperate Zone islands show no appreciable differentiation, it seems evident that they have become isolated at a comparatively recent date. Specimens of *Diglossa brunneiventris* from Colombia, for example, are inseparable from others from Peru, and it now appears that the bird described by me as *Oreomanes binghami* is but the immature plumage of *Oreomanes fraseri*, Doctor Hellmayr writes me that an immature specimen in the collection of the Munich Museum is molting from the plumage of "*binghami*" to that of *fraseri*. The chin and malar stripe are white, but the superciliaries have acquired, through molt, the chestnut color of those of the adult.

Cedrobamba, 1 female.

(4050) CONIROSTRUM CYANEUM Taczanowski.

Conirostrum cyaneum TACZANOWSKI, Proc. Zool. Soc., 1874, p. 512 (Sillapeta, Central Peru).

Occobamba Valley, 9,100 feet, 1 male, 1 female.

(4052) CONIROSTRUM FERRUGINEIVENTRIS Sclater.

Conirostrum ferrugineiventris SCLATER, Proc. Zool. Soc., 1855, p. 74, pl. 85 (Cachupata, Peru).

Above Torontoy (14,000 feet, timber line), 1 female.

(4054) CONIROSTRUM CINEREUM CINEREUM d'Orbigny and Lafresnaye.

Conirostrum cinereum d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 2, 1838, p. 25 (Yungas, Bolivia).

Our specimens have not been compared with topotypical ones.

Occobamba Valley, 9,100 feet, 2 males; Ollantaytambo, 2 males, 1 female; Huaracondo Canyon, 1 male; Calca, 1 ?; Cuzco, 2 males, 2 females.

(4057a) CONIROSTRUM ATROCYANEUM SORDIDUM Berlepsch.

Conirostrum atrocyaneum sordidum BERLEPSCH, Journ. für Ornith., 1901, p. 83 (western Bolivia).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 76 (Idma).

Found in the Subtropical Zone. I have seen no specimens from Ecuador, but Lafresnaye describes his type as having the primaries margined with olivaceous, a character in which our Peruvian birds agree. Berlepsch refers Idma specimens to his *C. a. sordidum* of Bolivia, a form which appears to have been separated without comparison with topotypical material, and which is here provisionally recognized.

Idma, 5 males, 2 females; San Miguel Bridge, 3 males.

(4059) XENODACNIS PARINA Cabanis.

Xenodacnis parina CABANIS, Journ. für Ornith., 1873, p. 312, pl. 4, figs. 1, 2 (Maraynioc, Peru).

Found in the Temperate Zone. I have seen only the specimens recorded below.

Machu Picchu, above timber line, 13,000–14,000 feet, 2 males (breeding, June 11), 1 female; Idma Pampa, 11,200 feet, 1 male.

(4061) DACNIS CAYANA GLAUCOGULARIS Berlepsch and Stolzmann.

Dacnis cayana glaucogularis BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 336 (La Gloria, Peru); Ornis, 1906, p. 77 (Idma).

Idma, 2 males, 2 females.

(4089–4091) IRIDOPHANES PULCHERRIMA PULCHERRIMA (Sclater).

Dacnis pulcherrima SCLATER, Rev. Zool., 1853, p. 480 (Bogotá).

Chlorophanes pulcherrima stigmatura BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 338 (Garita del Sol, central Peru); Ornis, 1906, p. 77 (Idma).

Found in the Subtropical Zone. None of our specimens exhibits the "grande tache blanche subterminale sur le barbe interne de la rectrice externe" attributed to this race. In several it is faintly suggested by a grayish area, but others are not distinguishable from males from Ecuador and Bogotá. It seems probable, therefore, that the quite distinct *I. p. aureinucha* Ridgway is restricted to the Pacific slope of the Ecuadorian Andes, while *I. p. pulcherrima* ranges from Colombia to southern Peru on the eastern slope of the range.

Idma, 5 males, 2 females.

Family TANAGRIDAE.

TANAGERS.

(4111) TANAGRA XANTHOGASTER (Sundevall).

Euphonia xanthogastra SUNDEVALL, Svensk. vet. Akad. Handl., 1833, p. 310 (Brazil).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 78 (Idma).

(4126) TANAGRA LANIIROSTRIS PERUVIANA (Berlepsch and Stolzmann).

Euphonia laniirostris peruviana BERLEPSCH and STOLZMANN, Ornis, 1906, p. 77 (La Merced; Santa Ana).

(4135) TANAGRA CHRYSOPASTA (Sclater and Salvin).

Euphonia chrysopasta SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 438, pl. 30, figs. 1, 2 (R. Ucayali, Peru).

Rio Cosireni, 1 male, 1 female (breeding, Sept. 20).

(4149) PIPRAEIDEA MELANOTA VENEZUELENSIS Sclater.

Pipridea venezuelensis SCLATER, Proc. Zool. Soc., 1856, p. 265 (Caracas, Venezuela).
Pipridea melanota BERLEPSCH and STOLZMANN, Ornis, 1906, p. 78 (Idma).

The two specimens listed below agree with others from Colombia.

San Miguel Bridge, 1 male, 1 female.

(4155) TANGARA CHILENSIS (Vigors).

Aglaia chilensis VIGORS, Proc. Zool. Soc., 1832, p. 3 (Chile-Bolivia. See Berlepsch, Rev. Tanag., 1910, p. 1026).

A species of the Tropical Zone. Peruvian specimens are larger than those from the Napo region.

Rio Cosireni, 2 males (breeding, Sept. 9, 11); Rio Comberciato, 1 male (breeding, Sept. 21).

(4163) TANGARA SCHRANKI (Spix).

Tanagra schranki SPIX, Av. Bras., vol. 2, 1825, p. 38, pl. 51, fig. 1 (northern Brazil See Berlepsch, Rev. Tanag., 1910, p. 1028).

A species of the Tropical Zone. Our specimens agree with others from Ecuador.

Rio Cosireni, 1 male, 1 female (breeding, Sept. 9, 11).

(4191) TANGARA GYROLOIDES CATHARINAE (Hellmayr).

Calospiza gyroloides catharinae HELLMAYR, Proc. Zool. Soc., 1911, p. 1106 (Chaquimayo, Carabaya, southeastern Peru).
Calospiza gyroloides BERLEPSCH and STOLZMANN, Ornis, 1906, p. 78 (Idma).

(4204) TANGARA NIGROVIRIDIS BERLEPSCHI (Taczanowski).

Calliste nigriviridis berlepschi TACZANOWSKI, Orn. Pér., vol. 2, 1884, p. 469 (Auquimarca, Peru).

Calospiza nigriviridis berlepschi BERLEPSCH and STOLZMANN, Ornis, 1906, p. 78 (Idma).

This well-marked race was found in the forests of the Subtropical Zone.

Idma, 2 males, 1 female; Huadquiña, 1 male (breeding, Oct. 23).

(4208a) TANGARA CYANEICOLLIS GULARIS Chapman.

Tangara cyaneicollis gularis CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 332 (Candamo, southeastern Peru).

Subspecific characters.—Most nearly related to *Tangara cyaneicollis cyaneicollis*, but male with head darker blue, of about the same shade as in *T. c. caeruleocephala*, but with no purple on the forehead and little if any on the throat.

Rio San Miguel (4,500 feet), 1 male, breeding October 2.

(4214) TANGARA FULVICERVIX (Sclater and Salvin).

Calliste fulvicervix SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 354, pl. 30, fig. 1 (Bolivia).

Calospiza fulvicervix BERLEPSCH and STOLZMANN, Ornis, 1906, p. 79 (Idma).

Abundant in the Subtropical Zone.

Idma, 18 males, 7 females; San Miguel Bridge, 1 male.

(4216) TANGARA MELANOTIS (Sclater).

Calliste melanotis SCLATER, Ibis, 1876, p. 408, pl. 2, fig. 1 (Rio Napo, Ecuador).

Calospiza melanotis BERLEPSCH and STOLZMANN, Ornis, 1906, p. 79 (Idma).

Found in the Subtropical Zone. Our specimens agree with one from Colombia.

Idma, 5 males; 3 females.

(4219) TANGARA PARZUDAKII (Lafresnaye).

Tanagra parzudakii LAFRESNAYE, Rev. Zool., 1843, p. 97 (Bogotá).

Calospiza parzudakii BERLEPSCH and STOLZMANN, Ornis, 1906, p. 79 (Idma).

? *Tangara parzudakii florentes* BANGS and NOBLE, The Auk, 1918, p. 459 (Charapi, northwestern Peru).

Inhabits the Subtropical Zone. Our series agrees closely in size and color with eight topotypical specimens of *parzudakii*. I have not seen *T. p. florentes* Bangs and Noble, based on a female from northern Peru. This bird is larger than any in our series, but in view of the practical identity of specimens from southern Peru and the type locality the validity of the proposed form seems questionable.

Idma, 7 males; 3 females.

(4222) TANGARA XANTHOCEPHALA XANTHOCEPHALA (Tschudi).

Calospiza xanthocephala TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 285 (cen. Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 79 (Idma).

Common in the Subtropical Zone.

Idma, 7 males, 3 females; San Miguel Bridge, 4 males, 1 female; Torontoy, 1 male.

(4224) TANGARA CHRYSOTIS (Du Bus).

Calliste chrysotis DU BUS, Esq. Orn., pl. 7, 1845 (Peru).

Rio San Miguel, 4,500 feet, 1 male (breeding, Oct. 5).

(4228) TANGARA ARGENTEA ARGENTEA (Tschudi).

Procnopis argentea TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 285 (Peru). *Calospiza argentea* BERLEPSCH and STOLZMANN, Ornis, 1906, p. 79 (Idma).

Inhabits the Subtropical Zone.

Idma, 3 males (1 breeding Oct. 17), 1 female; San Miguel Bridge, 2 males, 2 females.

(4234) IRIDOSORNIS JELSKII JELSKII Cabanis.

Iridornis jelskii CABANIS, Journ. für Ornith., 1873, p. 316, pl. 5, fig. 1 (Maraynioc, Peru).

Above Machu Picchu (12,000 feet, timber line), 2 males, breeding May 22 and June 8.

(4237) IRIDOSORNIS ANALIS (Tschudi).

Tanagra analis TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 287 (Peru).

Idma, 2 males

(4244) POECILOTHRAUPIS IGNIVENTRIS (d'Orbigny and Lafresnaye).

Aglaia igniventris d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 32 (Aplobamba, Bolivia).

Inhabits the humid Temperate Zone. Although obviously representing *P. lunulata*, our specimens show no indication of intergrading with that species.

Above Machu Picchu (12,000 feet, timber line), 6 males (3 breeding, May 23–June 2), 1 female.

(4254) BUTHRAUPIS CUCULLATA SATURATA Berlepsch and Stolzmann.

Buthraupis cucullata saturata BERLEPSCH and STOLZMANN, Ornis, 1906, p. 80 (Idma, Peru).

Occobamba Valley, 9,100 feet, 1 male; Torontoy, 10,700 feet, 1 male.

(4269) DUBUSIA STICTOCEPHALA Berlepsch and Stolzmann.

Dubusia stictocephala BERLEPSCH and STOLZMANN, Ibis, 1894, p. 386 (Maraynioc, Peru).

Occobamba Valley (9,100 feet), 1 female.

(4273) THRAUPIS EPISCOPUS MAJOR (Berlepsch and Stolzmann).

Tanagra coelestis major BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 343 (La Merced, Peru); Ornis, 1906, p. 81 (Santa Ana).

Tanagra coelestis SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro; Potrero).

Inhabits the arid Tropical Zone and ranges upward to the lower border of the Subtropical. The present form, *coelestis* and *leucoptera* are evidently representatives of one species. Several of our Peruvian specimens closely resemble others from the Bogotá region.

Santa Ana, 1 male, 1 female; Idma, 4 males, 1 female; Chauillay, 1 male; San Miguel Bridge, 2 males, 2 females.

(4281) THRAUPIS PALMARUM MELANOPTERA (Sclater).

Tanagra melanoptera SCLATER, Proc. Zool. Soc., 1856, p. 235 (Eastern Peru).

San Miguel Bridge, 1 female.

(4287) THRAUPIS DARWINI LAETA (Berlepsch and Stolzmann).

T[anagra] darwini laeta BERLEPSCH and STOLZMANN, Ornis, vol. 13, 1906, p. 81 (Cuzco; Idma).

Tanagra darwini SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 151 (Tinta).

Specimens from Cuzco, Calca, and Pisac are topotypical. There appears to exist no clear understanding regarding the limits of the range of this form and *T. d. darwini*. I have seen no specimens of the latter.

San Miguel Bridge, 1 female; Machu Picchu, 1 female; Chospiyoc, 1 female (breeding, April 20); Calca, 3 males, 2 females; Pisac, 1 male; Cuzco, 1 male, 1 female.

(4288) SPOROTHRAUPIS CYANOCEPHALA CYANOCEPHALA (d'Orbigny and Lafresnaye).

Aglaia cyanocephala d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 32 (Yungas, Bolivia).

Inhabits the Subtropical Zone. Our specimens average slightly smaller and more yellow than a topotypical series.

San Miguel Bridge, 3 males, 2 females; Torontoy, 1 male, 2 females; Occobamba Valley, 1 male.

(4298) RAMPHOCELUS CARBO CONNECTENS Berlepsch and Stolzmann.

Rhamphocelus jacapa connectens BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1896, p. 344 (La Merced, Peru); Ornis, 1906, p. 81 (Santa Ana; Idma).

Ramphocoelus atrosericeus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura; Potrero).

Common in the Tropical Zone ranging upward to the lower border of the Subtropical.

Rio Comberciato, 1 male (breeding, Sept. 25); Santa Ana, 1 female; Idma, 5 males (2 breeding, Oct. 14, 17); 3 females (2 breeding, Oct. 14, 17).

(4307) PIRANGA RUBRA RUBRA (Linnaeus).

Muscicapa rubra LINNAEUS, Syst. Nat., vol. 1, 1758, p. 181 (Carolina).

Piranga rubra BERLEPSCH and STOLZMANN, Ornis, 1906, p. 81 (Idma, 2 males; Oct., Nov.).

(4313) PIRANGA ARDENS (Tschudi).

Phoenisoma ardens TSCHUDI, Arch. für Naturg., 1844, vol. 1, p. 287 (central Peru).

Rio San Miguel, 4,500 feet, 1 male (breeding, Oct. 5).

(4314) PIRANGA TESTACEA TSCHUDII Berlepsch and Stolzmann.

Pyranga testacea tschudii BERLEPSCH and STOLZMANN, Proc. Zool. Soc., 1892, p. 375 (Lima); Ornis, 1906, p. 82 (Santa Ana).

Chauillay, 1 male, 2 females; Rio Comberciato, 1 female.

(4333) TACHYPHONUS RUFUS (Boddaert).

Tangara rufa BODDAERT, Tabl. Pl. Enl., 1783, p. 44 (Cayenne).

Tachyphonus melaleucus SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura; Huiro; Potrero).

Tachyphonus rufus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 82 (Santa Ana; Idma).

Santa Ana, 2 males (1 breeding, Oct. 25); Idma, 2 males, 2 females (1 breeding, Oct. 19).

(4344) TACHYPHONUS RUFIVENTER (Spix).

Tanagra rufiventer SPIX, Av. Bras., vol. 2, 1825, p. 37, pl. 1, fig. 1.

A female and an immature male are apparently referable to this species, of which I have seen no other specimens.

Rio Cosireni, 1 male, immature, 1 female (breeding).

(4370) HEMITHRAUPIS FLAVICOLLIS CENTRALIS (Hellmayr).

Nemosia flavicollis centralis HELLMAYR, Nov. Zool., vol. 14, 1907, p. 350 (Humaytha, Rio Madeira).

Our specimens agree with others from the Beni region of Bolivia and Matto Grosso, Brazil, in the jet blackness of the black areas. One of two males from the Rio Roosevelt, however, resembles a Cayenne specimen in the color of the black areas.

Rio Cosireni, 2 males (breeding).

(4383) THLYPOPSIS INORNATA (Taczanowski).

Nemosia inornata TACZANOWSKI, Proc. Zool. Soc., 1879, p. 228 (Tambillo, Peru).

Identified from descriptions only. Our specimen (unsexed) is more olive and less refuscent than the plate in the Catalogue of Birds of the British Museum.[57]

San Miguel Bridge, 1.

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[57] Vol. 11, pl. 13, fig. 2.

(4387) THLYPOPSIS RUFICEPS (d'Orbigny and Lafresnaye).

Sylvia ruficeps d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 1, 1837, p. 30 (Yuracares, Bolivia).

Thlypopsis ruficeps BERLEPSCH and STOLZMANN, Ornis, 1906, p. 82 (Idma).

Our specimens agree with a topotypical series.

Idma, 1; San Miguel Bridge, 3; Torontoy, 6; Calca, 1.

(4397) CHLOROSPINGUS FLAVIGULARIS FLAVIGULARIS (Sclater).

Pipilopsis flavigularis SCLATER, Rev. Zool., 1852, p. 8 (New Grenada).

Chlorospingus flavigularis parvirostris CHAPMAN, Bull. Amer. Mus. Nat. Hist., vol. 14, 1901, p. 227 (Inca Mine=Santo Domingo, southeastern Peru).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 82 (Idma).

The acquisition of additional topotypical material of both *flavigularis* and "*parvirostris*" shows that the latter form is based on an average difference quite lost by individual variation. It is not in my opinion worthy of recognition. Inhabits the Subtropical Zone.

Idma, 5; San Miguel Bridge, 4.

(4404) HEMISPINGUS ATROPILEUS AURICULARIS (Cabanis).

Chlorospingus auricularis CABANIS, Journ. für Ornith., 1873, p. 318 (Maraynioc, Peru).

The difference between the northern and southern forms of this species appears to be subspecific. Inhabits the humid Temperate Zone.

Occobamba Valley, 2.

(4409) HEMISPINGUS SUPERCILIARIS NIGRIFRONS (Lawrence).

Chlorospingus nigrifrons LAWRENCE, Ibis, 1875, p. 384 (Ecuador).

Inhabits the humid Temperate Zone. Our specimens agree with several from southern Colombia.

Occobamba Valley, 2 (1, July 29, breeding); above Torontoy (9,500 feet), 1 (May 4, breeding).

(4412) HEMISPINGUS FRONTALIS FRONTALIS (Tschudi).

Hylophilus frontalis TSCHUDI, Wiegm. Arch., 1844, vol. 1, p. 284 (Peru).

Chlorospingus frontalis BERLEPSCH and STOLZMANN, Ornis, 1906, p. 83 (Santa Ana).

Inhabits the Subtropical Zone. I am unable to separate the Colombian from the Peruvian birds. *H. f. oleagineus* should, therefore, in my present opinion, be synonymized with *frontalis*.[58]

San Miguel Bridge, 6.

(4421) PSEUDOSPINGUS XANTHOPHTHALMUS (Taczanowski).

Dacnis xanthophthalma TACZANOWSKI, Proc. Zool. Soc., 1874, p. 510 (Maraynioc, Peru).

Heller secured a male of this rare species heretofore known only from two males and three females from Maraynioc and a female from Tamiapampa (altitude, 9,000 feet). The bird agrees with descriptions.[59]

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[58] See Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 621.

Occobamba Valley, 9,100 feet, 1.

(4423) MICROSPINGUS TRIFASCIATUS Taczanowski.

Microspingus trifasciatus TACZANOWSKI, Proc. Zool. Soc., 1874, p. 132, pl. 19, fig. 1 (Maraynioc, Peru).

Heller secured this uncommon species at timber line in the humid Temperate Zone.

Cedrobamba, 3.

(4437a) SCHISTOCHLAMYS ATRA OLIVINA (Sclater).

Tanagra olivina [female] SCLATER, Proc. Zool. Soc., 1864, p. 607 (Cuyaba, Brazil) — SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Maranura).

?*Schistochlamys atra grisea* CORY, Field Mus. Pub. 190, 1916, p. 346 (Rioja, Peru).

Orchesticus ater [male] SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).

Schistochlamys atra BERLEPSCH and STOLZMANN, Ornis, 1906, p. 83 (Idma).

Inhabits the Tropical Zone. A large series from Matto Grosso averages slightly darker, especially below, than specimens from Cayenne and northeastern Venezuela (which may be considered typically to represent *atra*), but the black throat areas are not so intense and the black of the forehead grades insensibly into the gray of the crown or hind head and is not therefore sharply defined from it as it is in our specimens of true *atra*. Our Peruvian specimens average slightly darker in general coloration than those from Matto Grosso, but agree with them in the color of the black frontal areas and gradual change from black to gray on the crown. They should therefore unquestionably be referred to the southern rather than the northern form of this species and it seems probable that *S. a. grisea* Cory should also be placed here.

Santa Ana, 2; Idma, 2 (Oct. 20, breeding).

Family ICTERIDAE.

ORIOLES, CASSIQUES, Etc.

(4445a) OSTINOPS DECUMANUS MACULOSUS Chapman.

Ostinops decumanus maculosus CHAPMAN, Proc. Biol. Soc. Wash., vol. 33, July 24, 1920, p. 26.

Ostinops decumanus BERLEPSCH and STOLZMANN, Ornis, 1906, p. 84 (Pampa de Derrumbe; Santa Ana).

Rio Cosireni, 1; Chauillay, 1.

(4447) OSTINOPS ATROVIRENS (d'Orbigny and Lafresnaye).

Cassicus atrovirens d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 2, 1838, p. 1 (Yungaseni, Bolivia).

Ostinops atrovirens SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).—BERLEPSCH and STOLZMANN, Ornis, 1906, p. 85 (Idma).

Locally common in the Subtropical Zone.

Idma, 5; San Miguel Bridge, 3.

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[59] See Berlepsch and Taczanowski, Proc. Zool. Soc., 1896, p. 346.

(4457) CASSICUS CHRYSONOTUS d'Orbigny and Lafresnaye.

Cassicus chrysonotus d'ORBIGNY and LAFRESNAYE, Syn. Av., pt. 2, p. 3 (Yungas, Bolivia).

Torontoy, 1.

(4479) AGELAIUS THILIUS (Molina).

Turdus thilius MOLINA, Sagg. Storr. Nat. Chile, 1782, p. 211 (Chile).
Agelasticus thilius SCLATER and SALVIN, Proc. Zool. Soc., 1869, p. 153 (Tungasuca).
Agelaeus thilius BERLEPSCH and STOLZMANN, Ornis, 1906, p. 103 (Suriti; Cuzco).

Calca, 1.

Family CORVIDAE.

CROWS, JAYS.

(4547) CYANOCORAX VIOLACEUS Du Bus.

Cyanocorax violaceus DU BUS, Bull. Acad. Brux., vol. 14, 1847, p. 103 (Peru).

A species of the Tropical Zone.

Rio Comberciato, 2.

(4549) XANTHOURA YNCAS YNCAS (Boddaert).

Corvus yncas BODDAERT, Tabl. Pl. Enl., 1783, p. 38 (Peru).
Cyanocorax incas SCLATER and SALVIN, Proc. Zool. Soc., 1876, p. 16 (Huiro).
Xanthoura yncas BERLEPSCH and STOLZMANN, Ornis, 1906, p. 85 (Idma).

Common in the Subtropical Zone.

San Miguel Bridge, 6; Santa Rosa, 1; Idma, 2.

(4555) CYANOLYCA JOLYAEA (Bonaparte).

Cyanocitta jolyaea BONAPARTE, Journ. für Ornith., 1853, p. 47 (Peru).
Xanthoura jolyaea BERLEPSCH and STOLZMANN, Ornis, 1906, p. 85 (Tambillo).

(4555a) CYANOLYCA VIRIDICYANEA CUZCOENSIS Sclater.

Cyanolyca viridicyanea cuzcoensis SCLATER, Ibis, 1917, p. 465, pl. 8, fig. 1 (Huasampilla, altitude 10,000 feet, Peru).

This form requires comparison with *C. jolyaea* of which I have seen no specimens. It inhabits the forests of the humid Temperate Zone and hence is not found in the treeless Cuzco region.

Torontoy (9,500 feet), 1.

INDEX.

Page.

- Aburria aburri 45
- aburri, Aburria 45
  - Penelope 45
- Acaena ochreata 22
- Acestrura mulsanti 70
- Actitis macularia 50
- acutipennis, Hapalocercus 92
  - Myiosympotes 29,92
- acutirostris, Scytalopus 32,77
- addae, Steganura 68
- Adelomyia chlorospila 68
  - melanogenys 68
    - chlorospila 68
- adspersa, Ortalis guttata 44
- adspersus, Ortalis guttata 44
- aeneocauda, Metallura 38,69
  - Trochilus 69
- aequatorialis, Anaeretes parulus 92
- Agelaeus thilius 124
- Agelaius thilius 39,124
- Agelasticus thilius 124
- agilis, Anaeretes 93
- Aglaeactis castelnaudi 32,68
- Aglaia chilensis 117
  - cyanocephala 120
  - igniventris 119
- agraphia, Anaeretes 33,41,93
- Agriornis insolens 9
  - pollens 39,86
  - solitaria insolens 31,39,86
- alaudinus, Phrygilus 39
- albicapilla, Siptornis 39,83
  - Synallaxis 83
- albiceps, Elaenia 31,33,95
  - Elainea 95
- albicollis, Caprimulgus 64
  - Nyctidromus 64
- albifrons, Muscisaxicola 39,89
  - Ptyonura 89
- albilinea, Columba 32,45
  - Diglossa mystacalis 41,114
- albilora, Muscisaxicola 39,90
- albipennis, Columba 9,32,45
- albociliaris, Pitylus 110
  - Saltator 13,17,31,110
- Alcedo americana 63
- alnorum, Empidonax trailli 29,40,98
- Alopochelidon fucata 29,102
- alticola, Anas cristata 38,55
  - Aratinga mitrata 32,41,62
- Amazona farinosa inornata 63
  - mercenaria 63
- americana, Alcedo 63
  - Ceryle 28
  - Chloroceryle americana 63
- americanus, Podiceps 38,49

Page.

- amethysticollis, Heliangelus 32,68
  - Orthorhynchus 68
- amethystina, Calliphlox 70
  - Trochilus 70
- Amoropsittaca andicola 32,63
- Ampelis rubrocristata 101
- Anabates auritus 84
- Anaeretes agilis 93
  - agraphia 33,41,93
  - flavirostris 13,31,33,93
  - parulus 93
    - aequatorialis 92
- analis, Catamenia 109
  - Iridosornis 119
  - Tanagra 119
- analoides, Catamenia analoides 109
- Anas cristata alticola 38,55
  - leucogenis 56
  - oxyptera 55
  - platalea 55
  - puna 55
  - spinicauda 55
- andecola, Hirundo 101
  - Orochelidon 39,101
- andecolus, Micropus 65
- andicola, Amoropsittaca 32,63
  - Bolborhynchus 63
  - Columba plumbea 46
  - Leptasthenura andicola 82
  - Psittacula 63
- andina, Gallinago 50
  - braziliensis 38,50
  - Scolopax 50
- angustirostris, Muscicapa 92
  - Phylloscartes ventralis 92
  - Sayornis cineracea 97
- ani, Crotophaga 29,72
- annae, Ocreatus 68
  - Spathura 68
- Anser melanopterus 55
- Anta, Pampa of 13
- Antenor unicinctus 57
- Anthus bogotensis immaculatus 39,108
  - furcatus 39,108
- antisianus, Pharomachrus 70
- antisiensis, Pharomachrus 70
  - Trogon 70
- Antrostomus nigrescens 64
- approximans, Cercomacra 80
  - tyrannina 29,80
- Aquila megaloptera 57
- Aramides cajanea chiricote 48
- Aratinga frontatus 62
  - leucophthalma 63
  - mitrata alticola 32,41,62
    - mitrata 14,61,62

Page.

- Ardea cyanocephala 51
  - egretta 51
  - tayazu-guira 51
- ardens, Phoenisoma 121
  - Piranga 121
- ardesiaca, Fulica 38, 49
- ardosiaca, Tyrannula 98
- ardosiacus, Myiochanes ardosiacus 98
- argentea, Calospiza 119
  - Procnopis 119
  - Tangara argentea 119
- Arid Tropical Zone, List of Species of the 28
- arvensis, Fringilla 110
  - Sycalis 39, 110
- assimilis, Geothlypis canicapilla 106
- atacamensis, Cinclodes 39, 81
  - Upucerthia 81
- ater, Orchesticus 123
- Atlapetes canigenis 33, 41, 113
  - castaneifrons 113
- atra, Schistochlamys 123
- atrata, Carduelis 110
  - Cathartes 28
  - Chrysomitris 110
- atratus, Spinus 39, 110
- atriceps, Myiarchus 99
- atrosericeus, Ramphocelus 120
- atrovirens, Cassicus 123
  - Ostinops 14, 123
- Atticora cyanoleuca 102
  - fasciata 101
  - fucata 28
- audax, Hadrostomus 99
  - Platypsaris 99
  - Troglodytes 103
    - musculus 29
- Aulacorhynchus caeruleocinctus 75
- Aulanax latirostris 97
- aura, Cathartes 56
  - Vultur 56
- aurantiicinctus, Capito auratus 73
- auratus, Capito auratus 72
- aurea, [Rupicola peruviana] 101
- aureinucha, Iridophanes pulcherrima 116
- auriceps, Pharomachrus 21, 70
  - Trogon 70
- auricularis, Chlorospingus 122
  - Hemispingus atropileus 33, 122
- aurifrons, Myospiza aurifrons 111
- auritus, Anabates 84
  - Pseudocolaptes boissonneauti 84
- azarae, Saltator 110
    - caerulescens 110
  - Synallaxis azarae 82
- Baccharis 22
- Basileuterus coronatus 107
  - luteoviridis luteoviridis 106
    - signatus 14, 106, 107
    - striaticeps 106
    - superciliaris 33, 41, 106
  - signatus 11, 107
  - tristriatus 107
- behni, Trogon variegatus 71
- Berberis flexuosa 17
- berlepschi, Calliste nigriviridis 118
  - Calospiza nigriviridis 118

Page.

- berlepschi, Ochthoeca fumicolor 33, 87
  - Pseudochloris olivascens 112
- berlepschii, Tangara nigroviridis 118
- Bernicla melanoptera 55
- bicolor, Microrhopias 80
- binghami, Oreomanes 41, 115
- Boissonneaua matthewsi 68
- Bolborhynchus andicola 63
  - orbignesius 63
- boliviana, Nothura 44
    - maculosa 38, 44
  - Penelope 44
  - Piaya cayana 72
- bolivianus, Capito auratus 73, 74
  - Scytalopus 79
    - micropterus 79
  - Trogon 71
  - Trogonurus 71
  - Tyranniscus 94
- Bourcieria inca 67
- Brachyspiza capensis peruviana 15, 39, 111
- branickii, Odontorchilus 102
  - Odontorhynchus 102
  - Theristicus 18, 38, 51
- brasiliana, Strix 61
- brasilianum, Glaucidium 61
- brasilianus, Phalacrocorax 56
- brunneifrons, Ochthoeca fumicolor 87
- brunneinucha, Buarremon 114
- brunnei-nucha, Embernagra 114
- brunneinuchus, Buarremon 114
- brunneitorques, Chaetura 65
  - Cypseloides 65
    - brunneitorques 65
- brunneiventris, Diglossa 9, 13, 17, 31, 33, 114, 115
- Buarremon brunneinucha 114
  - brunneinuchus 114
- Bubo virginianus 60
    - nacurutu 60
- Bucco chacuru 28, 29, 75
  - striolatus 75
  - versicolor 74
- Buteo erythronotus 38, 57
  - hypospodius 58, 59
  - melanosternus 59
  - poecilochrous 38, 57, 58
  - poliosomus 58
- Buthraupis cucullata saturata 11, 33, 119
- Caenotriccus ruficeps 33, 91
- caerulea, Dendroica 40, 105
- caeruleocephala, Tangara cyaneicollis 118
- caeruleocinctus, Aulacorhynchus 75
- caesar, Poospizopsis 9, 33, 111
- Calca 15
- calipareus, Podiceps 49
- Calliphlox amethystina 70
- Calliste chrysotis 119
  - fulvicervix 118
  - melanotis 118
  - nigriviridis berlepschi 118
- Calospiza argentea 119
  - fulvicervix 118
  - gyroloides 117
    - catharinae 117
  - melanotis 118

Page.

- Calospiza nigriviridis berlepschi 118
  - xanthocephala 119
- Campephilus haematogaster 77
  - melanoleucus melanoleucus 77
- canadensis, Muscicapa 106
  - Sylvania 106
  - Wilsonia 40, 106
- canigenis, Atlapetes 33, 41, 113
- canipileus, Chloronerpes rubiginosus 76
- Capito aurantiicinctus 73
  - auratus aurantiicinctus 73
    - auratus 72, 73
    - bolivianus 73, 74
    - insperatus 27, 72, 73
    - intermedius 73
  - glaucogularis 74
  - punctatus 72
  - versicolor 74
- Caprimulgus albicollis 64
  - torquatus 64
- Carduelis atrata 110
- Casinchihua 10
- Cassicus atrovirens 123
  - chrysonotus 124
- castaneifrons, Atlapetes 113
- castanotis, Pteroglossus 75
  - castanotis 75
- castelnaudi, Aglaeactis 32, 68
  - Trochilus 68
- Catamenia analis 109
  - analoides analoides 109
    - griseiventris 33, 44, 109
  - inornata inornata 33, 109
- catharinae, Calospiza gyroloides 117
  - Tangara gyroloides 117
- Catharista urubu 28, 56
- Cathartes atrata 28
  - aura 56
- Catharus sp 104
- Cauca Valley 23
- cayana, Piaya 72
- cayanus, Charadrius 50
  - Hoploxypterus 28, 50
- cayennensis, Muscicapa 96
  - Myiozetetes 29, 96
- ceciliae, Columba (Chamaepelia) 46
  - Gymnopelia ceciliae 38
- Cecropia 21
- Cedrobamba 21
- Cellus grammicus 77
- centralis, Hemithraupis flavicollis 121
  - Nemosia flavicollis 121
- Centrites oreas 91
- Ceophloeus lineatus 29, 77
  - lineatus 77
- Cephalopterus ornatus 27, 101
- cephalotes, Myiarchus 98
- Cerchneis sparveria 28, 60
  - subsp 38
- Cercomacra approximans 80
  - tyrannina approximans 29, 80
- Certhilauda tenuirostris 81
- cerulea, Sylvia 105
- Ceryle americana 28
- Chachapoyas 11
- chacuru, Bucco 28, 29, 75

Page.

- Chaetocercus mulsanti 70
- Chaetura brunneitorques 65
  - zonaris 65
- Chalcostigma olivaceum 32, 69
  - stanleyi vulcani 32, 69
- Chamaepelia erythrothorax 46
  - griseola 47
  - minuta minuta 28, 47
- Chanchamayo 11
- Charadrius cayanus 50
  - resplendens 50
- Chauillay 9
- chiguanco, Semimerula 33, 104
  - Turdus 104
- chilensis, Aglaia 117
  - Tangara 117
- chionogaster, Leucippus 66
- chiricote, Aramides cajanea 48
  - Rallus 48
- Chirimoto 11
- chivi, Sylvia 105
  - Vireo 105
  - Vireosylva chivi 29, 105
- Chlöephaga melanoptera 18, 38
- chlorepiscius, Myiarchus mexicanus 98
  - tyrannulus 29, 98
- chloris, Pseudochloris olivascens 39, 111
  - Sycalis 111
- chloroauchenia, Leptoptila 47
- Chloroceryle americana americana 63
- chlorolaemus, Momotus aequatorialis 63
- chloromeros, Pipra 99
- Chloronerpes chrysogaster 76
  - rubiginosus canipileus 76
    - meridensis 76
- Chlorophanes pulcherrima stigmatura 116
- chlorospila, Adelomyia 68
  - melanogenys 68
- Chlorospingus auricularis 122
  - flavigularis flavigularis 122
    - parvirostris 122
  - frontalis 122
  - nigrifrons 122
- Chlorostilbon daphne 66
  - prasinus 66
    - daphne 28, 66
- choliba, Otus 28, 61
  - Pisorhina 61
  - Strix 61
- Chondrohierax uncinatus 60
- Chospiyoc 16
- chrysocephalus, Myiodynastes 96
    - chrysocephalus 96
  - Scaphorhynchus 96
- chrysogaster, Chloronerpes 76
  - Pheucticus chrysocephalus 108
  - Pitylus 108
- Chrysomitris atrata 110
- chrysonotus, Cassicus 124
- chrysopasta, Tanagra 117
- Chrysotis inornata 63
- chrysotis, Calliste 119
  - Tangara 119
- Chusqueo quila 22
- Ciccaba huhula 28, 61
- Cillurus rivularis 81

Page.
cinchoneti, Conopias 96
Tyrannus 96
Cinclodes atacamensis 39, 81
fuscus 81
rivularis 17, 39, 81
Cinclus 13
leucocephalus 103
cineracea, Sayornis nigricans 97
cinerea, Euscarthmus 92
Serpophaga 31, 32, 92
cinereicapillus, Colaptes 76
cinereiceps, Tyranniscus 94
Tyrannulus 94
cinereum, Conirostrum 116
cinereum 18, 33, 116
Todirostrum cinereum 29, 91
cinereus, Circus 38, 57
Todus 91
cinnamomea, Muscipeta 96
cinnamomeus, Myiobius cinnamomeus 96
Circus cinereus 38, 57
Cistothorus graminicola 102
platensis graminicola 39, 102
Cnemarchus erythropygius 86
Cniparchus haematogaster haematogaster 77
coelestis, Tanagra 120
Colaptes cinereicapillus 76
puna 13, 17, 18, 39, 76
rupicola 76
Colibri cyanotus 67
iolata 67
iolatus 67
collaris, Trogon 71
Trogonurus collaris 71
Collectia spinosa 17
coloreum, Todirostrum cinereum 91
Columba albilinea 32, 45
albilinea 45
albipennis 9, 32, 45
(Chamaepelia) ceciliae 46
frenata 47
melanoptera 47
minuta 47
montana 47
plumbea andicola 46
propinquua 46
rufina 45
rufina 28, 45
columbiana, Lampropygia 67
olumbigallina minuta 47
comata, Pipra leucocilla 99
Comberciato, Rio 11, 14, 26, 27
Compsothlypis pitiayumi 105
elegans 29, 105
Conirostrum atrocyaneum sordidum 116
cinereum 116
cinereum 18, 33, 116
cyaneum 33, 116
ferrugineiventris 33, 116
connectens, Pseudochloris uropygialis 39, 41, 112
Ramphocelus 29
carbo 120
jacapa 120
conniveus, Myiozetetes similis 11, 96
Conopias cinchoneti 96
Conurus mitratus 61

Page.
coquimbae, Nothoprocta 43
coronatus, Basileuterus 107
Myiodioctes 107
Corvus yncas 124
Coryphospingus cristatus 113
cucullatus 28, 29, 113
Cosireni, Rio 11, 14, 25, 27
Coturniculus peruanus 111
Crax cumanensis 45
Creciscus viridis facialis 28, 48
Crex facialis 48
cristata, Elaenia 28, 29, 95
Elainea 95
Heliochera 18
cristatus, Coryphospingus 113
Crotophaga ani 29, 72
Crypturellus 43
Crypturus obsoletus punensis 43
parvirostris 28, 43
soui 27, 43
tataupa 43
cucullata, Fringilla 113
Geothlypis aequinoctialis 29, 106
Sylvia 106
cucullatus, Coryphospingus 28, 29, 113
Cuculus naevius 72
cumanensis, Crax 45
Pipile 45
cunicularia, Pholeoptynx 61
Curahausi 10
curvirostris, Nothoprocta 43
Cuzco 8
District of 10
cuzcoensis, Cyanolyca viridicyanea 33, 124
cyaneicollis, Tangara cyaneicollis 118
cyaneum, Conirostrum 33, 116
cyanocephala, Aglaia 120
Ardea 51
Sporothraupis cyanocephala 120
cyanocephalus, Nycticorax 38, 51, 52, 53
Cyanocitta jolyaea 124
Cyanocorax incas 124
violaceus 124
Cyanolesbia mocoa smaragdina 69
cyanoleuca, Atticora 102
Hirundo 102
Cyanolyca jolyaea 33, 124
viridicyanea cuzcoensis 33, 124
cyanoptera, Querquedula 55
cyanopterus, Pterophanes 38, 68
Trochilus 68
cyanotus, Colibri 67
Trochilus 67
Cypseloides brunneitorques 65
brunneitorques 65
Cypselus montivagus 65

Dacnis cayana glaucogularis 116
pulcherrima 116
xanthophthalma 122
Dafila spinicauda 38, 55
daphne, Chlorostilbon 66
prasinus 28, 66
darwini, Tanagra 120
darwini 120
decumanus, Ostinops 123

Page.

- Dendroica caerulea 40, 105
  - rara 105
- dependens, Spinus 17
- Didelphis 19
- Diglossa brunneiventris 9, 13, 17, 31, 33, 114, 115
  - indigotica 115
  - melanopis 115
  - mystacalis 33
    - albilinea 41, 114
    - mystacalis 114
  - pectoralis 114
  - personata 115
    - melanopis 18, 33, 115
  - sittoides 114
    - sittoides 114
- Diplopterus naevius 72
- Diuca speculifera 39, 113
- Dubusia stictocephala 33, 119
- Dysithamnus olivaceus 29, 79
- ecaudatum, Todirostrum 92
- ecaudatus, Orchilus 92
- Echaratí 10, 14
- egretta, Ardea 51
  - Herodias 51
- Elaenea flavogaster 94
- Elaenia albiceps 31, 95
    - modesta 95
    - subsp 33
  - cristata 28, 29, 95
  - flavogaster 29
  - flavogaster flavogaster 94
  - gigas 28, 29, 94
  - modesta 95
  - obscura obscura 95
  - pallatangae 95
  - viridicata 95
- Elainea albiceps 95
  - cristata 95
  - obscura 95
  - pagana 94
  - pallatangae 95
  - placens 95
- elegans, Compsothlypis pitiayumi 28, 105
- Emberiza speculifera 113
  - unicolor 113
- Embernagra brunnei-nucha 114
- emiliae, Phoethornis 66
  - guyi 66
- Empidochanes poecilurus peruanus 97
- Empidonax pusillus trailli 98
  - trailli alnorum 29, 40, 98
- episcopus, Thraupis 14
- Eriocnemis sapphiropygia 68
- Erismatura ferruginea 55
- Erythrina 21
- erythrocercus, Myiarchus 98
- erythroleuca, Grallaria 33, 80
- erythronotus, Buteo 38, 57
  - Haliaetus 57
- erythrops, Leptopogon 94
- erythropygia, Taenioptera 86
- erythropygius, Cnemarchus 86
  - Myiotheretes 39
- erythrothorax, Chamaepelia 46
- Escallonia 20
- estella, Oreotrochilus 39, 67

Page.

- estella, Trochilus 67
- euophrys, Myiothlypis 107
- Eupetomena hirundo 66
  - macroura hirundo 28, 66
- Euphonia chrysopasta 117
  - laniirostris peruviana 117
  - xanthogastra 117
- Eurypyga major meridionalis 27, 51
- Euscarthmus cinerea 92
  - leucogaster 91
  - margaritaceiventer 28
  - margaritaceiventris rufipes 29, 91
  - pyrrhops 91
  - wuchereri 91
- excelsus, Phrygilus alaudinus 113
- facialis, Creciscus viridis 28, 48
  - Crex 48
- falcinellus, Ibis 51
- Falcinellus ridgwayi 51
- Falco fusco-caerulescens 15, 32, 38, 60
  - uncinatus 60
  - unicinctus 57
- falklandicus, Nycticorax cyanocephalus 53
- fasciata, Atticora 101
  - Hirundo 101
  - Pipra 96
- fasciatus, Sublegatus 28, 96
    - fasciatus 29, 96
- femoralis, Hypotriorchis 60
- ferruginea, Erismatura 55
  - Oxyura 38, 55
- ferrugineiventris, Conirostrum 33, 116
- flammulata, Siptornis 84
- flavigularis, Chlorospingus flavigularis 122
  - Pipilopsis 122
- flavirostris, Anaeretes 17, 31, 33, 93
- flavogaster, Elaenea 94
  - Elaenia 29
    - flavogaster 94
  - Pipra 94
- flavovirens, Leptopogon 92
- flexuosa, Berberis 17
- florentes, Tangara parzudakii 118
- fluviatilis, Muscisaxicola 29, 90
- Formicivora rufa rufatra 80
  - rufatra 80
- fraseri, Oreomanes 33, 41, 115
- frenata, Columba 47
  - Gallinago 50
  - Geotrygon 47
  - Oreopeleia 47
- Fringilla arvensis 110
  - cucullata 113
  - fruticeti 112
- frontalis, Chlorospingus 122
  - Hemispingus frontalis 122
  - Hylophilus 122
- frontatus, Aratinga 62
- fruticeti, Fringilla 112
  - Phrygilus 39, 112
- fucata, Alopochelidon 29, 102
  - Atticora 28
  - Hirundo 102
- Fulica 13
  - ardesiaca 38, 49
  - gigantea 38, 49

Page.
fulvescens, Nothoprocta 38, 43
fulvicervix, Calliste 118
Calospiza 118
Tangara 118
fulvigularis, Malacoptila 75
fulvigularis 75
furcatus, Anthus 39, 108
fuscicapillus, Picolaptes 86
Thripobrotus 86
fusco-caerulescens, Falco 15, 32, 38, 60, 81
Gallinago andina 50
braziliensis andina 38, 50
frenata 50
Gallinula galeata garmani 38
garmani 48
Gambetta melanoleuca 50
garmani, Gallinula 48
galeata 48
Geositta tenuirostris 18, 31, 39, 81
Geothlypis aequinoctialis cucullata 29, 106
canicapilla assimilis 106
Geotrygon frenata 47
Geranoaetus melanoleucus 60
gigantea, Fulica 38, 49
gigantodes, Semimerula gigas 33, 104
gigas, Elaenia 28, 29, 94
Patagona 39, 66
Trochilus 66
Glaucidium brasilianum 61
glaucogularis, Capito 74
Dacnis cayana 116
Grallaria erythroleuca 32, 80
rufula obscura 18, 80
sororia 80
graminicola, Cistothorus 102
platensis 39, 102
Siptornis 39, 84
Synallaxis 84
grammicus, Celeus 77
grisea, Muscisaxicola 39, 90
Schistochlamys atra 123
griseipectus, Phacellodomus striaticeps 39, 41, 85
griseiventris, Catamenia analoides 33, 41, 109
Synallaxis 82
griseocularis, Sublegatus 96
griseola, Chamaepelia 47
gryphus, Sarcorhamphus 38, 56
Vultur 56
gularis, Tangara cyaneicollis 118
guttata, Margarornis 85
Ortalis 44
Penelope 44
Premnornis 85
gutturalis, Spermophila 108
guyi, Phaethornis 66
Gymnopelia ceciliae ceciliae 38, 46
gymnops 47
gymnops, Gymnopelia ceciliae 47
Gynoxys 20
gyroloides, Calospiza 117
Hadrostomus audax 99
haematogaster, Campephilus 77
Cniparchus haematogaster 77
Picus 77
haematostigma, Mesopicus 76
Haliaetus erythronotus 57

Page.
Hapalocercus acutipennis 92
Heliangelus amethysticollis 32, 68
Helianthea coeligena obscura 67
inca 67
osculans 67
Heliochera cristata 18
rubrocristata 33, 101
semidiagrammatic representation of the range of 36
Heliodoxa leadbeateri 67
Helodromas solitarius 28, 40, 50
Hemispingus atropileus auricularis 33, 122
frontalis frontalis 122
oleagineus 122
superciliaris nigrifrons 33, 122
Hemithraupis flavicollis centralis 121
Henicorhina leucophrys 103
leucophrys 19, 103
Herodias egretta 51
Herpsilochmus motacilloides 79
heterurus, Xenops 85
rutilus 85
hilaris, Campias 76
Veniliornis haematostigma 29, 76
Hirundinea sclateri 96
Hirundo andecola 101
cyanoleuca 102
fasciata 101
fucata 192
ruficollis 102
zonaris 65
hirundo, Eupetomena 66
macroura 28, 66
Hoploxypterus cayanus 28, 50
Huambutio 13
Huaracondo, 13; Canyon, 13; River 16
Huatanay, Rio 13
huhula, Ciccaba 28, 61
Strix 61
huhulum, Syrnium 61
Huiro 9
Hydrocorax vigua 56
Hydropsalis lyra 64
torquata 64
Hylopezus rufula obscura 33
Hylophilus frontalis 122
hypochlorus, Lophotriccus squamaecristatus 11, 91
hypoleuca, Zenaida 46
hypospodia, Synallaxis 29, 83
hypospodius, Buteo 58, 59
Hypotriorchis femoralis 60
Ibis falcinellus 51
Ibycter megalopterus 57
Idma 10, 14, 24
igniventris, Aglaia 119
Poecilothraupis 33, 119
immaculatus, Anthus bogotensis 39, 108
inca, Bourcieria 67
Helianthea 67
incas, Cyanocorax 124
inconspicua, Sporophila gutturalis 11, 29, 108
indigotica, Diglossa 115
inornata, Amazona farinosa 63
Catamenia inornata 33, 109
Chrysotis 63
Linaria 109

Page.
inornata, Nemosia 121
  Thlypopsis 121
insolens, Agriornis 9
  solitaria 31, 39, 86
insperatus, Capito auratus 27, 72, 73
intermedius, Capito auratus 73
iolata, Colibri 67
  Petasophora 67
iolatus, Colibri 67
Iridophanes pulcherrima aureinucha 116
  pulcherrima 116
Iridosornis analis 119
  jelskii 110
  jelskii 33, 119
jacarini, Tanagra 109
  Volatinia jacarini 29, 109
jacquacu, Penelope 27, 44
  jacquacu 44
jelskii, Iridosornis 119
  jelskii 33, 119
  Picumnus 77
jolyaea, Cyanocitta 124
  Cyanolyca 33, 124
josephae, Vireo 105
  Vireosylva 14
  Vireosylva 105
Junin, Lake 11
juninensis, Podiceps calliparaeus 38, 49
  Speotyto cunicularia 38, 61
kalinowskii, Nothoprocta 38, 44
Knipolegus aterrimus ockendeni 89
  heterogyna ockendeni 89
laeta, Tanagra darwini 10, 13
  Thraupis darwini 9, 33, 120
La Merced 11
Lampropygia columbiana 67
  obscura 67
langsdorffi, Pteroglossus 75
  Selenidera 75
La Raya 7, 8, 12, 14, 15
Larus serranus 38, 49
laticlavius, Saltator 110
latirostris, Aulanax 97
  Sayornis nigricans 97
leadbeateri, Heliodoxa 67
Leptasthenura andicola andicola 82
  peruviana 39, 40, 82
  pileata 39, 82
Leptodon uncinatus 60
Leptopogon erythrops 94
  flavovirens 92
  rufipectus 94
  superciliaris superciliaris 94
  tristis 92
  ventralis 92
Leptoptila chloroauchenia 47
  ochroptera 47
  ochroptera 28, 47
lessoni, Ochthoeca lessoni 88
Lessonia niger oreas 9, 39, 91
Leucippus chionogaster 66
  leucogaster 66
  viridicauda 66
leucocephalus, Cinclus 103
leucogaster, Euscarthmus 91
  Leucippus 66

Page.
leucogaster, Trochilus 66
leucogenis, Anas 56
leucogenys, Merganetta 32, 56
  leucogenys 56
leucometopa, Ochthoeca 87
  leucophrys 33, 87
leucophrys, Henicorhina 103
  leucophrys 19, 103
  Ochthoeca 87
  Troglodytes 103
leucophthalma, Aratinga 63
leucophthalmus, Psittacus 63
leucops, Planesticus 104
  Turdus 104
leucoptera, Tanagra 120
Licamachay 10
Life Zones of the Urubamba Valley 26
Linaria inornata 109
lineatus, Ceophloeus 29, 77
  lineatus 77
  Picus 77
Lochmias obscurata 82
  sororia 82
Lomaria 22
Lophotriccus squamaecristatus hypochlorus 11, 91
  pileatus 91
Luatanay 10
lunulata, Poecilothraupis 119
lyra, Hydropsalis 64
  Uropsalis 64
Machu Picchu 14
Macropsalis lyra peruana 64
macrourus, Troglodytes solstitialis 33, 103
macularia, Actitis 50
  Tringa 50
macularius, Tringoides 50
maculirostris, Muscisaxicola 39, 90
maculosa, Nothura 28
maculosus, Ostinops decumanus 27, 123
magnirostris, Rupornis 59
Malacoptila fulvigularis 75
  fulvigularis 75
  melanopogon 75
major, Tanagra coelestis 120
  Thraupis episcopus 29, 120
Maramora 10
Maraynioc 8
margaritaceiventer, Euscarthmus 28
Margarornis guttata 85
  perlata 33, 85
  peruviana 85
matthewsi, Boissonneaua 68
  Panoplites 68
  Trochilus 68
maximus, Saltator 109
Mecocerculus leucophrys nigriceps 88
  setophagoides 33, 88
  poecilocercus 89
  stictopterus euplastus 89
  taeniopterus 33, 89
  subtropicalis 41, 89
  taeniopterus 89
megaloptera, Aquila 57
  Ibycter 38
megalopterus, Ibycter 57
  Milvago 57

Page.

- melaleucus, Tachyphonus 121
- melancholicus, Tyrannus 29, 99
  - Tyrannulus melancholicus 99
- melanocephalus, Myioborus melanocephalus 14, 19
- melanochrous, Thamnophilus 10, 14, 19, 27, 29, 79
- melanogenys, Adelomyia 68
- melanoleuca, Scolopax 50
- melanoleucus, Campephilus melanoleucus 77
  - Geranoaëtus 60
  - Picus 77
  - Spizaetus 60
  - Spiziastur 38, 60
  - Totanus 40, 50
- melanopis, Diglossa personata 18, 33, 115
- melanopogon, Malacoptila fulvigularis 75
- melanoptera, Bernicla 55
  - Chloephaga 18, 38
  - Columba 47
  - Metriopelia 47
    - melanoptera 47
  - Tanagra 120
  - Thraupis palmarum 29, 120
- melanosternus, Buteo 59
- melanota, Pipridea 117
- melanotis, Calliste 118
  - Calospiza 118
  - Tangara 118
- mercenaria, Amazona 63
  - Psittacus 63
- Merganetta leucogenys 32, 56
  - leucogenys 56
- meridensis, Chloronerpes rubiginosus 76
  - Pheucticus uropygialis 108
- meridionalis, Eurypyga major 27, 51
- Mesopicus haematostigma 76
- Metallura aeneocauda 38, 69
  - smaragdinicollis smaragdinicollis 32, 69
- Metriopelia melanoptera 47
  - melanoptera 38, 47
  - saturatior 47
- Microcrypturus 43
- micropterus, Scytalopus 77
- Micropus andecolus 65
  - parvulus 65
  - montivagans 32, 65
  - parvulus 32, 40, 65
  - peruvianus 40, 65
- Microrhopias bicolor 80
  - rufa rufater 28, 80
  - quixensis 80
- Microspingus trifasciatus 33, 123
- Mijuca 19
- Milvago megalopterus 57
- minuta, Chamaepelia minuta 28, 47
  - Columba 47
  - Columbigallina 47
- Mionectes poliocephalus 93
  - striaticollis poliocephalus 93
- mitrata, Aratinga mitrata 14, 61, 62
- mitratus, Conurus 61
- Mitrephanes ochraceiventer 97
  - olivaceus 97
- modesta, Elaenia 95
  - albiceps 95
  - Siptornis 83
- Momotus aequatorialis chlorolaemus 63

Page.

- Monasa morphoeus peruana 27, 75
- montana, Columba 47
  - Oreopeleia 47
- montivagans, Micropus 32
- montivagus, Cypselus 65
  - Micropus 65
- motacilloides, Herpsilochmus 79
- mulsanti, Acestrura 70
  - Chaetocercus 70
  - Ornismya 70
- murina, Orochelidon 39, 101
  - Petrochelidon 101
- Muscicapa angustirostris 92
  - canadensis 106
  - cayennensis 96
  - olivacea 105
  - (Todirostrum) ruficeps 91
  - rubra 121
- Muscipeta cinnamomea 96
  - obscura 95
- Muscisaxicola albifrons 39, 89
  - albilora 39, 90
  - fluviatilis 29, 90
  - grisea 39, 90
  - maculirostris 39, 90
  - occipitalis 90
  - rufivertex 31, 39, 90
    - ruficrissa 90
- Myiarchus atriceps 99
  - cephalotes 98
  - erythrocercus 98
  - mexicanus chlorepiscius 98
  - pelzelni 28, 29, 99
  - tyrannulus chlorepiscius 29, 98
- Myiobius cinnamomeus cinnamomeus 96
  - fasciatus saturatus 29, 97
  - naevius 97
    - saturatus 97
  - ochraceiventer 97
  - subochraceus 97
- Myioborus melanocephalus melanocephalus 14, 19, 106
  - verticalis 106
- Myiochanes ardosiacus ardosiacus 98
- Myiodioctes coronatus 107
  - tristriatus 107
- Myiodynastes chrysocephalus 96
  - chrysocephalus 96
- Myiopagis viridicata 29, 95
- Myiosympotes acutipennis 29, 92
- Myiotheretes erythropygius 39
- Myiothlypis euophrys 107
  - nigrocristatus 106
  - striaticeps, 107
- Myiozetetes cayennensis 29, 96
  - similis connivens, 11, 96
- Myospiza aurifrons aurifrons 111
  - peruana 29, 111
  - peruana 111
- mystacalis, Diglossa 33
  - mystacalis 114
- nacurutu, Bubo virginianus 60
  - Strix 60
- naevia, Tapera 14, 29, 72
- naevius, Cuculus 72
  - Diplopterus 72

Page.
naevius, Myiobius ... 97
Nycticorax ... 15, 52, 53
Tapera ... 72
nattereri, Rupornis ... 59
Nemosia flavicollis centralis ... 121
inornata ... 121
Nettion oxypterum ... 18, 38, 55
niger, Scytalopus ... 77
nigrescens, Antrostomus ... 64
nigricans, Sayornis ... 97
nigriceps, Mecocerculus leucophrys ... 88
nigricrissa, Piaya cayana ... 72
nigrifrons, Chlorospingus ... 122
Hemispingus superciliaris ... 33, 122
nigrocristatus, Myiothlypis ... 106
nobilis, Oreonympha ... 32, 69
noronha, Zenaida auriculata ... 46
Nothoprocta coquimbae ... 43
curvirostris ... 43
fulvescens ... 38, 43
kalinowskii ... 38, 44
perdicaria ... 43
Nothura boliviana ... 44
maculosa ... 28
boliviana ... 38, 44
peruviana ... 11, 28, 44
nuna, Ornismya ... 70
Psalidoprymna ... 32, 70
Nycticorax cyanocephalus ... 38, 51, 52, 53
falklandicus ... 53
naevius ... 15, 52, 53
tayazu-guira ... 38, 51, 52, 53
obscurus ... 51
Nyctidromus albicollis ... 64
Nystalus striolatus ... 75
obscura, Elaenia obscura ... 95
Elainea ... 95
Grallaria rufula ... 18, 80
Helianthea coeligena ... 67
Hylopezus rufula ... 33
Lampropygia columbiana ... 67
Muscipeta ... 95
Oropezus rufula ... 80
Piaya cayana ... 28, 72
Sporophila ... 28, 29, 109
obscurata, Lochmias ... 82
obscurus, Nycticorax ... 51
occidua, Rupornis magnirostris ... 59
occipitalis, Muscisaxicola ... 90
Occobamba Pass ... 18
Valley ... 18
ochraceiventer, Mitrephanes ... 97
Myiobius ... 97
ochreata, Acaena ... 22
Ocreatus annae ... 68
ochroptera, Leptoptila ... 47
ochroptera ... 28, 47
Ochthoeca frontalis spodionota ... 33, 87
fumicolor berlepschi ... 33, 87
brunneifrons ... 87
lessoni lessoni ... 88
tectricialis ... 33, 41, 88
leucometopa ... 87
leucophrys ... 87
leucometopa ... 33, 87
oenanthoides ... 87

Page.
Ochthoeca oenanthoides polionota ... 39, 87
pulchella ... 87
rufipectoralis ... 88
spodionota ... 87
thoracica ... 33, 88
ockendeni, Knipolegus aterrimus ... 89
heterogyna ... 89
Odontophorus stellatus ... 45
Odontorchilus branickii branickii ... 102
Odontorhynchus branickii ... 102
oenanthoides, Ochthoeca ... 87
oleagineus, Hemispingus frontalis ... 122
olivacea, Muscicapa ... 105
Vireosylva ... 40, 105
Vireosylvia ... 105
olivaceum, Chalcostigma ... 32, 69
olivaceus, Dysithamnus ... 29, 79
Mitrephanes ... 97
Ramphomicron ... 69
Thamnophilus ... 79
olivina, Schistochlamys atra ... 29, 123
Tanagra ... 123
Ollantaytambo ... 17
orbignesius, Bolborhynchus ... 63
orbignyanus, Thinochorus ... 18, 38, 50
Tinochorus ... 50
Orchesticus ater ... 123
Orchilus ecaudatus ... 92
rufipes ... 91
oreas, Centrites ... 91
Lessonia niger ... 9, 39, 91
orenocensis, Veniliornis haematostigma ... 77
Oreomanes binghami ... 41, 115
fraseri ... 33, 41, 115
Oreonympha nobilis ... 32, 69
Oreopeleia frenata ... 47
montana ... 47
Oreotriccus plumbeiceps ... 92
Oreotrochilus estella ... 39, 67
orinomus, Querquedula ... 55
cyanoptera ... 38, 55
Oriolestes ... 19
ornatus, Cephalopterus ... 27, 101
Ornismya mulsanti ... 70
nuna ... 70
Orochelidon andecola ... 39, 101
murina ... 39, 101
Oropezus rufula obscura ... 80
Ortalis guttata ... 44
adspersa ... 44
Orthorhynchus amethysticollis ... 68
smaragdinicollis ... 69
Ortyx stellata ... 45
osculans, Helianthea ... 67
Ostinops atrovirens ... 14, 123
decumanus ... 123
maculosus ... 27, 123
ottonis, Siptornis ... 39, 84
Otus choliba ... 28, 61
oxyptera, Anas ... 55
Querquedula ... 55
oxypterum, Nettion ... 18, 38, 55
Oxyura ferruginea ... 38, 55

Pacaymayo ... 10
Pachyrhamphus versicolor ... 100

Page.

- Pachyrhamphus versicolor versicolor 100
- pagana, Elainea 94
- pallatangae, Elaenia 95
  - Elainea 95
- pallens, Zenaida auriculata 28, 46
- pallida, Upucerthia 31, 39, 81
- palpebralis, Schizoeaca 33, 82
- Paltaypampa 10
- Pampa de Derrumbe 10
- Pampaconas River 25
- Panoplites matthewsi 68
- Parabuteo unicinctus 57
  - unicinctus 28
- Paramo Zone 34
- Pardirallus rytirhynchus rytirhynchus 38, 48
  - tschudii 48
- parina, Xenodacnis 33, 116
- Parula pitiayumi 105
- parulus, Anaeretes 93
- parvirostris, Chlorospingus flavigularis 122
  - Crypturus 28, 43
- parvulus, Micropus 65
  - andecolus 65
- parzudakii, Tanagra 118
  - Tangara 118
- Patagona gigas 39, 66
- pectoralis, Diglossa 114
- pelzelni, Myiarchus 28, 29, 99
- Penelope aburri 45
  - boliviana 44
  - guttata 44
  - jacquacu 27, 44
    - jacquacu 44
  - sclateri plumosa 44
  - speciosa 44
- Peramys 19
- perdicaria, Nothoprocta 43
- perlata, Margarornis 33, 85
  - Strix 61
    - flammea 61
  - Tyto 28, 32, 61
- perlatus, Sittasomus 85
- personata, Diglossa 115
- personatus, Trogon 70
  - Trogonurus 70
- peruana, Macropsalis lyra 64
  - Monasa morphoeus 27, 75
  - Myospiza 111
    - aurifrons 29, 111
- peruanus, Coturniculus, 111
  - Empidochanes poecilurus 97
  - Spinus ictericus 110
- peruviana, Brachyspiza capensis 15, 39, 111
  - Euphonia laniirostris 117
  - Leptasthenura andicola 39, 40, 82
  - Margarornis perlata 85
  - Nothura maculosa 11, 28, 44
  - Pyrgita 111
  - Rupicola 100
    - peruviana 21, 100
  - Tanagra laniirostris 29, 117
- peruvianus, Micropus 32, 40, 65
  - Spinus icterus 33
- Petasophora iolata 67
- Petrochelidon murina 101
- Phacellodomus striaticeps griseipectus 39, 41, 85

Page.

- Phaethornis guyi 66
- Phalacrocorax brasilianus 56
  - vigua 56
    - vigua 28, 38, 56
- Pharomachrus antisianus 70
  - antisiensis 70
  - auriceps 21, 70
  - chrysocephalus chrysogaster 108
- Pheucticus uropygialis meridensis 108
  - terminalis 41, 108
  - uropygialis 108
- Phoenisoma ardens 121
- Phoethornis emiliae 66
  - guyi emiliae 66
- Pholeoptynx cunicularia 61
- Phrygilus alaudinus 39
  - excelsus 113
  - fruticeti 39, 112
  - gayi punensis 39, 112
  - plebeius 113
  - plebejus 39, 113
  - unicolor 18
    - unicolor 39, 113
- Phylloscartes ventralis angustirostris 92
- Piaya cayana 72
  - boliviana 72
  - obscura 28, 72
  - nigricrissa 72
- Picolaptes fuscicapillus 86
  - lacrymiger warszewiczi 86
- Picumnus jelskii 77
- Picus haematogaster 77
  - lineatus 77
  - melanoleucus 77
- pileata, Leptasthenura 39, 82
- pileatus, Lophotriccus squamaecristatus 91
- Pipile cumanensis 45
- Pipilopsis flavigularis 122
- Pipra chloromeros 99
  - fasciatus 96
  - flavogaster 94
  - leucocilla comata 99
- Pipraeidea melanota venezuelensis 117
- Pipridea melanota 117
  - venezuelensis 117
- Piranga ardens 121
  - rubra 121
    - rubra 40, 121
  - testacea 28
    - tschudi 29
    - tschudii 121
- Pisac 13, 15
- Pisorhina choliba 61
- pitiayumi, Compsothlypis 105
  - Parula 105
- Pitumarca 9
- Pitylus albociliaris 110
  - chrysogaster 108
- placens, Elainea 95
- Planesticus leucops 104
  - serranus 104
  - sp 104
- platalea, Anas 55
  - Spatula 38, 55
- Platypsaris audax 99
- plebeius, Phrygilus 113

Page.

- plebejus, Phrygilus 39, 113
- Plegadis ridgwayi 38, 51
- plumbeiceps, Oreotriccus 92
  - Pogonotriccus 92
- plumosa, Penelope sclateri 44
- Podiceps americanus 38, 49
  - calipareus 49
  - calliparaeus juninensis 38, 49
  - rollandi 49
- pœcilocercus, Mecocerculus 89
  - Serpophaga 89
- poecilochrous, Buteo 38, 57, 59
- Poecilothraupis igniventris 33, 119
  - lunulata 119
- Pogonotriccus plumbeiceps 92
- poliocephalus, Mionectes 93
    - striaticollis 93
- polionota, Ochthoeca oenanthoides 39, 87
- poliosomus, Buteo 58
- pollens, Agriornis 39, 86
- Poospizopsis caesar 9, 33, 111
- Potrero 10
- prasinus, Chlorostilbon 66
- Premnornis guttata 85
- Procnopis argentea 119
- propinqua, Columba plumbea 46
- proxima, Siptornis modesta 39, 41, 83, 84
- Psalidoprymna nuna 32, 70
- Pseudochloris olivascens berlepschi 112
    - chloris 39, 111
  - uropygialis connectens 39, 41, 112
    - uropygialis 112
- Pseudocolaptes boissonneauti auritus 84
- Pseudospingus xanthophthalmus 33, 122
- Psittacula andicola 63
- Psittacus leucophthalmus 63
  - mercenaria 63
- Pteroglossus castanotis 75
    - castanotis 75
  - langsdorffi 75
- Pterophanes cyanopterus 38, 68
  - temmincki 68
- Ptiloscelys resplendens 38, 50
- Ptyonura albifrons 89
- pulchella, Ochthoeca 87
- pulcherrima, Dacnis 116
  - Iridophanes pulcherrima 116
- puna, Colaptes 13, 17, 18, 39, 76
  - Querquedula 38, 55
  - Troglodytes musculus 33, 102
- Puna Zone 34
  - Origin of the Avifauna of the 35
- Puna Zone Birds, Distributional Analysis of. 38
- punctatus, Capito 72
- punensis, Crypturus obsoletus 43
  - Phrygilus gayi 39, 112
- Puquiura 13
- Pygochelidon cyanoleuca 102
- Pyranga testacea tschudii 121
- Pyrgita peruviana 111
- pyrrhops, Euscarthmus 91
- Querquedula cyanoptera 55
    - orinomus 38, 55
  - orinomus 55
  - oxyptera 55
  - puna 38, 55

Page.

- quixensis, Microrhopias 80
- radiatus, Thamnophilus 79
- Rallus chiricote 48
  - rytirhynchus 48
- Ramphocelus atrosericeus 120
  - carbo connectens 29, 120
  - jacapa connectens 120
- Ramphomicron olivaceus 69
  - vulcani 69
- rara, Dendroica 105
- resplendens, Charadrius 50
  - Ptiloscelys 38, 50
  - Vanellus 50
- ridgwayi, Falcinellus 51
  - Plegadis 38, 51
- Rio Comberciato, 7, 11, 14, 26; Cosireni, 11, 25; Pampaconas, 24; San Miguel 24
- rivularis, Cillurus 81
  - Cinclodes fuscus 17, 39, 81
- rollandi, Podiceps 49
- rubra, Muscicapa 121
  - Piranga 121
    - rubra 40, 121
- rubrocristata, Ampelis 101
  - Heliochera 33, 101
- rufa, Tangara 121
- rufater, Microrhopias rufa 29, 80
  - Thamnophilus 80
- rufatra, Formicivora 80
    - rufa 80
- ruficeps, Caenotriccus 33, 91
  - Muscicapa (Todirostrum) 91
  - Sylvia 122
  - Thlypopsis 122
  - Tinamus 42
    - major 27
- ruficervix, Stenopsis 64
  - Thermochalcis 32, 64
- ruficollis, Hirundo 102
  - Stelgidopteryx ruficollis 29, 102
- ruficrissa, Muscisaxicola rufivertex 90
- rufina, Columba 45
  - rufina 28, 45
- rufipectoralis, Ochthoeca 88
- rufipectus, Leptopogon 94
- rufipes, Euscarthmus margaritaceiventer 29, 91
  - Orchilus 91
- rufiventer, Tachyphonus 121
  - Tanagra 121
- rufivertex, Muscisaxicola 31, 39, 90
- rufus, Tachyphonus 29, 121
- Rupicola peruviana 100
    - aurea 101
    - peruviana 21, 100
    - saturata 100
  - saturata 100
- rupicola, Colaptes 76
- Rupornis magnirostris 59
    - occidua 59
  - nattereri 59
- rytirhynchus, Rallus 48
  - Pardirallus rytirhynchus 48
- sajamae, Siptornis modesta 83, 84
- salmoni, Tigrisoma 54
- Saltator albociliaris 13, 17, 31, 110
  - azarae 110

Page.

- Saltator caerulescens azarae, 110
  - laticlavius, 110
  - maximus, 109
- San Fernando, 24
- San Geronimo, 10
- San Miguel Bridge, 14, 20, 30
- San Miguel, Rio, 24
- Santa Ana, 8, 14, 22
  - District of, 10
  - Valley of, 27
- sapphiropygia, Eriocnemis, 68
  - Vestipedes, 38, 68
- Sarcorhamphus gryphus, 38, 56
- saturata, Buthraupis cucullata, 11, 33, 119
  - Rupicola, 100
    - peruviana, 100
- saturatior, Metriopelia melanoptera, 47
- saturatus, Myiobius fasciatus, 29, 97
  - naevius, 97
- Sayornis cineracea angustirostris, 97
  - nigricans, 97
    - cineracea, 97
    - latirostris, 97
- Scaphorhynchus chrysocephalus, 96
- Schistochlamys atra, 123
  - grisea, 123
  - olivina, 29, 123
- Schizoeaca palpebralis, 33, 82
- schranki, Tanagra, 117
  - Tangara, 117
- sclateri, Hirundinea, 96
  - Todirostrum, 91
- Scolopax andina, 50
  - melanoleuca, 50
- scrutator, Thripadectes, 85
- Scytalopus acutirostris, 32, 77
  - bolivianus, 79
  - micropterus, 77
    - bolivianus, 79
  - niger, 77
  - silvestris, 78
  - simonsi, 78
  - sp, 33, 78
- Selenidera langsdorffi, 75
- Semimerula chiguanco, 33, 104
  - gigas gigantodes, 33, 104
- Serpophaga cinerea, 31
  - cinerea, 92
  - poecilocercus, 89
- serranus, Larus, 38, 49
  - Planesticus, 104
  - Turdus, 104
- Serrirostrum sittoides, 114
- Setophaga melanocephala, 106
  - verticalis, 106
- setophagoides, Mecocerculus leucophrys, 33, 88
  - Tyrannula, 88
- signatus, Basileuterus, 11, 107
  - luteoviridis, 14
- silvestris, Scytalopus, 78
- simonsi, Scytalopus, 78
- Siptornis albicapilla, 39, 83
  - flammulata, 84
  - graminicola, 39, 84
  - modesta, 83
    - proxima, 39, 41, 83, 84
    - sajamae, 83, 84

Page.

- Siptornis ottonis, 39, 84
  - urubambensis, 39, 40, 84
- Sittasomus perlatus, 85
- sittoides, Diglossa, 114
    - sittoides, 114
  - Serrirostrum, 114
- smaragdina, Cyanolesbia mocoa, 69
- smaragdinicollis, Metallura smaragdinicollis, 32, 69
  - Orthorhynchus, 69
- smaragdinus, Trochilus, 69
- solitaria, Tringa, 50
- solitarius, Helodromas, 28, 40, 50
- sordidum, Conirostrum atrocyaneum, 116
- sororia, Grallaria, 80
  - Lochmias, 82
- soui, Crypturus, 27, 43
- sparverius, Cerchneis, 28, 38, 60
  - Tinnunculus, 60
- Spathura annae, 68
- Spatula platalea, 38, 55
- speciosa, Penelope, 44
- speculifera, Diuca, 39, 113
  - Emberiza, 113
- Speotyto cunicularia juninensis, 38, 61
- Spermophila gutturalis, 108
- spinicauda, Anas, 55
  - Dafila, 38, 55
- spinosa, Collectia, 17
- Spinus atratus, 39, 110
  - dependens, 17
  - ictericus peruanus, 33, 110
- Spizaetus melanoleucus, 60
- Spiziastur melanoleucus, 38, 60
- spodionota, Ochthoeca, 87
    - frontalis, 33, 87
- Sporophila gutturalis inconspicua, 11, 29, 108
  - obscura, 28, 28, 109
- Sporothraupis cyanocephala cyanocephala, 120
- Steganura addae, 68
- Stelgidopteryx ruficollis ruficollis, 29, 102
- stellata, Ortyx, 45
- stellatus, Odontophorus, 45
- Stenolobium, 17
- Stenopsis ruficervix, 64
- stictocephala, Dubusia, 33, 119
- stigmatura, Chlorophanes pulcherrima, 116
- Streptoprocne zonaris zonaris, 28, 65
- striaticeps, Basileuterus luteoviridis, 106, 107
  - Myiothlypis, 107
- striolatus, Bucco, 75
  - Nystalus, 75
- Strix brasiliana, 61
  - choliba, 61
  - flammea perlata, 61
  - huhula, 61
  - nacurutu, 60
  - perlata, 61
- Sublegatus fasciatus, 28, 96
  - fasciatus, 29, 96
  - griseocularis, 96
- subochraceus, Myiobius, 97
- subradiatus, Thamnophilus, 79
    - nigricristatus, 79
    - radiatus, 29, 79
- Subtropical Zone, 30
- subtropicalis, Mecocerculus, 41, 89
- superciliaris, Basileuterus luteoviridis, 33, 41, 106

Page.
superciliaris Leptopogon superciliaris 94
Suriti 10
Sycalis arvensis 39, 110
chloris 111
Sylvania canadensis 106
Sylvia cerulea 105
chivi 105
cucullata 106
ruficeps 122
Synallaxis albicapilla 83
azarae azarae 82
graminicola 84
griseiventris 82
hypospodia 29, 83
Syrnium huhulum 61
Taenioptera erythropygia 86
taeniopterus, Mecocerculus 89
stictopterus 33, 89
Tachyphonus melaleucus 121
rufiventer 121
rufus 29, 121
Tambillo 10
Tanagra analis 119
chrysopasta 117
coelestis 120
major 120
darwini 120
darwini 120
laeta 10, 13
jacarini 109
lanirostris peruviana 29, 117
leucoptera 120
maximus 109
melanoptera 120
olivina 123
parzudakii 118
rufiventer 121
schranki 117
xanthogaster 117
Tangara argentea argentea 119
chilensis 117
chrysotis 119
cyaneicollis caeruleocephala 118
cyaneicollis 118
gularis 118
fulvicervix 118
gyroloides catharinae 117
melanotis 118
nigroviridis berlepschii 118
parzudakii 118
florentes 118
rufa 121
schranki 117
xanthocephala xanthocephala 119
tao, Tinamus 42
Tapacolas 77
Tapera naevia 14, 29, 72
naevius 72
tataupa, Crypturus 43
tayazu-guira, Ardea 51
Nycticorax 52, 53
naevius 38, 58
tectricialis, Ochthoeca lessoni 33, 41, 88
temmincki, Pterophanes 68
Temperate Zone 7, 30
avifauna of the 32
Distributional Analysis of Birds of the 32

Page.
tenuirostris, Certhilauda 81
Geositta 18, 31, 39, 81
terminalis, Pheucticus uropygialis 41, 108
testacea, Piranga 28
Thamnophilus melanochrous 10, 14, 19, 27, 29, 79
nigricristatus subradiatus 79
olivaceus 79
radiatus 79
subradiatus 29, 79
rufater 80
subradiatus 79
Theristicus branickii 18, 38, 51
Thermochalcis ruficervix 32, 64
thilius, Agelaeus 124
Agelaius 39, 124
Agelasticus 124
Turdus 124
Thinocorus orbignyanus 18, 38, 50
Thlypopsis inornata 121
ruficeps 122
thoracica, Ochthoeca 33, 88
Thraupis darwini laeta 9, 33, 120
episcopus 14, 29, 120
palmarum melanoptera 29, 120
Thripadectes scrutator 85
Thripobrotus fuscicapillus 86
warscewiczi 86
warscewiczi 86
Tigrisoma salmoni 54
Tinamus major ruficeps 27
ruficeps 42
tao 42
Tinnunculus sparverius 60
cinnamominus 60
Tinochorus orbignyanus 50
Tinta 9, 13
Titicaca, Lake 12
Todirostrum cinereum 91
cinereum 29, 91
coloreum 91
ecaudatum 92
sclateri 91
Todus cinereus 91
Torontoy 14, 19, 30
torquata, Hydropsalis 64
torquatus, Caprimulgus 64
Totanus melanoleucus 40, 50
traillі, Empidonax pusillus 98
trifasciatus, Microspingus 33, 123
Tringa macularia 50
solitaria 50
Tringoides macularius 50
tristis, Leptopogon 92
tristriatus, Basileuterus 107
Myiodioctes 107
Trochilus aeneocauda 69
amethystina 70
castelnaudi 68
cyanopterus 68
cyanotus 67
estella 67
gigas 66
leucogaster 66
matthewsi 68
smaragdina 69
Troglodytes audax 103
leucophrys 103
musculus audax 29, 103

Page.

- Troglodytes musculus puna 33, 102
  - solstitialis macrourus 33, 103
- Trogon antisiensis 70
  - auriceps 70
  - bolivianus 71
  - collaris 71
  - personatus 70
  - variegatus behni 71
- Trogonurus bolivianus 71
  - collaris collaris 71
  - personatus 70
  - variegatus 71
  - virginalis 71
- Tropical Zone 27
  - Species of the Arid 28
- tschudi, Piranga testacea 29
- tschudii, Pardirallus rytirhynchus 48
  - Piranga testacea 121
  - Pyranga testacea 121
- Ttica-Ttica 13, 16, 31, 34
- Tungasuca 9
- Turdus chiguanco 104
  - gigantodes 104
  - leucops 104
  - serranus 104
  - thilius 124
- Tyranniscus bolivianus 94
    - viridissimus 94
  - cinereiceps 94
  - viridissimus 94
- Tyrannula setophagoides 88
- Tyrannulus cinereiceps 94
  - melancholicus melancholicus 99
- Tyrannus melancholicus 29, 99
  - cinchoneti 96
- Tyto perlata 28, 32, 61
- uncinatus, Chondrohierax 60
  - Falco 60
  - Leptodon 60
- unicinctus Antenor 57
  - Falco 57
  - Parabuteo 57
    - unicinctus 28
- unicolor, Emberiza 113
  - Phrygilus 18
    - unicolor 39, 113
- Upucerthia, semidiagrammatic representation of the range of 37
  - atacamensis 81
  - pallida 31, 39, 81
- Uropsalis lyra 64
- uropygialis, Pheucticus uropygialis 108
  - Pseudochloris uropygialis 112
- Urquillos 10
- Urubamba River 16, 14
- Urubamba Valley, Distributional List of 380 species and subspecies of birds known from the 41
  - Life-Zones of the 26
  - Previous ornithological work in the 9
- urubambensis, Siptornis 39, 40, 84
- urubu, Catharista 28, 56
- Vanellus resplendens 50
- variegatus, Trogonurus 71

Page.

- venezuelensis, Pipraeidea melanota 117
  - Pipridea 117
- Veniliornis haematostigma hilaris 29, 76
    - orenocensis 77
- ventralis, Leptopogon 92
- versicolor, Bucco 74
  - Capito 74
  - Pachyrhamphus 100
    - versicolor 100
  - Vireo 100
- verticalis, Myioborus 106
  - Setophaga 106
- Vestipedes sapphiropygia 38, 68
- vigua, Hydrocorax 56
  - Phalacrocorax 56
    - vigua 28, 38, 56
- Vilcabamba 10
- violaceus, Cyanocorax 124
- Vireo chivi 105
  - josephae 105
  - versicolor 100
- Vireosylva chivi chivi 29, 105
  - josephae 14
    - josephae 105
  - olivacea 40, 105
- Vireosylvia olivacea 105
- virginalis, Trogonurus 71
- virginianus, Bubo 60
- viridicata, Elaenia 95
  - Myiopagis 29, 95
- viridicauda, Leucippus 66
- viridissimus, Tyranniscus 94
    - bolivianus 94
- Volatinia jacarini jacarini 29, 109
- vulcani, Chalcostigma stanleyi 32, 69
  - Ramphomicron 69
- Vultur aura 56
  - gryphus 56
- warscewiczi, Picolaptes lacrymiger 86
  - Thripobrotus 86
    - warscewiczi 86
- Wilsonia canadensis 40, 106
- wuchereri, Euscarthmus 91
- xanthocephala, Calospiza 119
  - Tangara xanthocephala 119
- xanthogaster, Tanagra 117
- xanthogastra, Euphonia 117
- xanthophthalma, Dacnis 122
- xanthophthalmus, Pseudospingus 33, 122
- Xanthoura yncas 124
    - yncas 124
- Xenodacnis parina 33, 116
- Xenops heterurus 85
  - rutilus heterurus 85
- yncas, Corvus 124
  - Xanthoura 124
    - yncas 124
- Yuvini 25
- Zenaida auriculata noronha 46
    - pallens 28, 46
  - hypoleuca 46
- zonaris, Chaetura 65
  - Hirundo 65
  - Streptoprocne zonaris 28, 65
- Zone, Humid Temperate 7, 8
    - Puna 15

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